DOCUMENT RESUME

ED 321 979 SE 051 487

AUTHOR Gallagher-Allred, Charlette R.; Stein, Joan Z.
TITLE Nutrient Content of Foods, Nutritional Supplements, and Food Fallacies. Nutrition in Primary Care Series, Number 1.
INSTITUTION Ohio State Univ., Columbus. Dept. of Family Medicine.
SPONS AGENCY Health Resources and Services Administration (DHHS/PHS), Rockville, MD. Bureau of Health Professions.
PUB DATE 80
CONTRACT 232-78-0194
NOTE 55p.; For related documents, see SE 051 486-502. See SE 051 503-512 for "Nutrition in Health Promotion" series.
PUB TYPE Guides - Classroom Use - Materials (For Learner) (051)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Biochemistry; *Dietetics; Disease Control; Ethnic Groups; Health Education; *Independent Study; *Medical Education; Medicine; *Nutrition; *Nutrition Instruction; Physiology; Preventive Medicine; Science Education; Therapeutic Environment; Therapy

ABSTRACT

Nutrition is well-recognized as a necessary component of educational programs for physicians. This is to be valued in that of all factors affecting health in the United States, none is more important than nutrition. This can be argued from various perspectives, including health promotion, disease prevention, and therapeutic management. In all cases, serious consideration of nutrition related issues in the practice is seen to be one means to achieve cost-effective medical care. These modules were developed to provide more practical knowledge for health care providers, and in particular primary care physicians. The modules were written by dieticians and nutritionists working closely with physicians. The modules were field tested and reviewed by basic and clinical science faculty in a number and variety of educational programs. This module assists in answering typical questions patients ask concerning foods--their nutrient content, proper storage and cooking methods, and nutritional adequacy of their typical food intake. Included are the learning goals and objectives, self-checks of achievement with regard to goals, and references for the physician and for the physician to give to the patient. The appendices include a food composition table, several charts on ethnic foods, a description of a good diet, a discussion on vitamins and minerals, recommended heights and weights, a chart of recommended daily allowances, and a list of principle food sources of nutrients. (CW)

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1 Nutrient Content of Foods, Nutritional Supplements, and Food Fallacies

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Nutrition in Primary Care

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1 Nutrient Content of Foods, Nutritional Supplements, and Food Fallacies

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Contract Number: 232-78-0194

U.S. Department of Health and Human Services
Public Health Service · Health Resources Administration
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A special note of appreciation is extended to persons in family practice residency programs and universities throughout Ohio for reviewing the materials, and to the faculty and residents where the materials were piloted:

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Composition: Pony-X-Press, Columbus, Ohio
Camera Work: Printers' Service, Columbus, Ohio
Reproduction and Binding: PIP, Store 523, Columbus, Ohio

Library of Congress Catalog Card Number: 80-82859

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1 Nutrient Content of Foods, Nutritional Supplements, and Food Fallacies

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Introduction

Nutrition is part of almost everyone's vocabulary — a fact that is both positive and negative. It is positive in that a resurgent interest in nutrition may stimulate better eating patterns among people; negative in that it fosters a preponderance of so-called nutrition experts, more correctly termed "nutrition quacks" among both the lay and professional communities. Quack experts abound today on nutrition and arthritis, nutrition and hyperkinetics, nutrition and mental disorders, and nutrition and cancer, to mention only a few.

The science of nutrition is a relatively new field of study and, like all new fields of study, has had and is still having growing pains. Answers to even some so-called simple problems are not fully recognized — such as the question "What is an optimal diet?" There is not simply one answer to this question as the answer is complicated by the fact that we cannot define *optimal* under all circumstances. What constitutes optimal in one case may not be optimal in another situation. The enigma of these and other questions in nutrition provides the open door to food faddism and leaves the physician without firm answers to many nutrition and food questions.

What do physicians need to know about nutrition which will be of assistance to them in combating food and nutrition misinformation and in providing the best nutritional care to patients? This module assists in answering typical questions patients ask concerning foods — their nutrient content, proper storage and cooking methods, and the nutritional adequacy of their typical, oftentimes ethnic, food intake.

Goals

As a result of this unit of study, you should be able to:

1. *Evaluate a patient's typical dietary intake for nutritional adequacy based on an understanding of the Recommended Dietary Allowances (RDA), Daily Food Guide, and ethnic food choices;*

2. *Identify the effects on nutrient content of foods of storage, cooking, and processing;*

3. *Assist patients in identifying nutrition information on labels and in using these labels to plan daily food intake and check the nutritional adequacy of their diet; and*

4. *Answer patients' questions, such as:*
   "Should I use organic gardening methods in growing a vegetable garden?"
   "I am scared of additives in my foods — should I avoid all processed foods?"
   "Is the nutrient content of brown bread better than that of white bread?"
   "I try to eat well, but should I take a nutritional supplement every day to ensure nutritional adequacy?"

Evaluating a Patient's Nutritional Intake

As you know, a good diet is essential for good health. You will, therefore, frequently want to ask patients to provide you with a typical day's food intake so you can assess it for adequacy. Techniques for eliciting an accurate diet history are presented in Module 2 on appraisal of nutritional status. Patients from whom you or one of your office staff members will most frequently elicit a diet history are those susceptible to nutritional risk, including such patients as the following:

- The growing child.
- The pregnant adolescent.
- The elderly patient.
- The suspected or known alcoholic.
- The patient with hypermetabolism, stress, fever, or disease (cancer, diabetes, gastrointestinal disease, malabsorption, burns).
- The postsurgical or recuperating patient.

To evaluate the nutritional adequacy of a patient's typical dietary intake, let us look at the following example:

Typical Breakfast

1 fried egg
1 slice whole wheat toast
1 slice bacon
1 cup skimmed milk
1 teaspoon margarine
½ cup orange juice

Typical Lunch

1 bologna sandwich consisting of:
  2 slices white bread
  2 slices (2 ounces) bologna
  1 slice (¾ ounce) pasteurized processed cheese
  lettuce leaf
  tomato slice
1 small bag potato chips
1 medium banana
1 cup skimmed milk

Typical Dinner

3 ounces fried beef patty
½ cup mashed potatoes
2 Tablespoons gravy
½ cup cooked buttered carrots
Tossed green salad, small bowl
2 Tablespoons Thousand Island salad dressing
1 cup skimmed milk
1 slice frosted angel food cake

Evening Snack

2 to 3 cups buttered popped corn
1 12-ounce Pepsi

The basic four food groups are (1) the milk group, (2) the meat group, (3) the fruit and vegetable group, and (4) the bread, grain, and cereal group. A balanced diet should include all four food groups. Age of the patient alters the need for the number of servings recommended for each group.

How would you attempt to rationally evaluate this patient's dietary intake? By looking at it, it appears adequate in kilocalories and all nutrients because it is varied and includes three meals. But is it adequate? By what guidelines is nutritional adequacy judged?

First, let us look at the Daily Food Guide and its contribution to the evaluation process. The Daily Food Guide, also called The Guide to Good Eating or the Basic Four Food Groups, was developed by Harvard University's Department of Nutrition and the United States Department of Agriculture and is designed to facilitate planning an adequate daily food intake. It permits people to plan adequate diets by selecting food rather than calculating amounts of nutrients. The Daily Food Guide is presented in terms of specific food groups, each including a variety of foods that are needed by persons in differing amounts according to age groups.

In the Daily Food Guide, common foods are classified into one of four groups. Foods of similar nutritional values are grouped together and can be substituted for one another. Recommendations are given for the number and size of servings of food from each group that should be eaten daily to assure adequate nutrient intake. Figure 1–1, on both sides of the page, is a copy of the guide as distributed by the National Dairy Council for public education, entitled Guide to Good Eating.

Figure 1–1 Daily Food Guide

Guide to Good Eating...

A Recommended Daily Pattern

The recommended daily pattern provides the foundation for a nutritious, healthful diet.

The recommended servings from the Four Food Groups for adults supply about 1200 Calories. The chart below gives recommendations for the number and size of servings for several categories of people.

Food Group	Recommended Number of Servings				
	Child	Teenager	Adult	Pregnant Woman	Lactating Woman
Milk 1 cup milk, yogurt, OR **Calcium Equivalent**: 1½ slices (1½ oz) cheddar cheese 1 cup pudding 1¼ cups ice cream 2 cups cottage cheese*	3	4	2	4	4
Meat 2 ounces cooked, lean meat, fish, poultry, OR **Protein Equivalent**: 2 eggs 2 slices (2 oz) cheddar cheese* ½ cup cottage cheese* 1 cup dried beans, peas 4 tbsp peanut butter	2	2	2	3	2
Fruit-Vegetable ½ cup cooked or juice 1 cup raw Portion commonly served such as a medium-size apple or banana	4	4	4	4	4
Grain, whole grain, fortified, enriched 1 slice bread 1 cup ready-to-eat cereal ½ cup cooked cereal, pasta, grits	4	4	4	4	4

*Count cheese as serving of milk OR meat, not both simultaneously.

Others: complement but do not replace foods from the Four Food Groups. Amounts should be determined by individual calorie needs.

Nutrients for Health

Nutrients are chemical substances obtained from foods during digestion. They are needed to build and maintain body cells, regulate body processes, and supply energy.

About 50 nutrients, including water, are needed daily for optimum health. If one obtains the proper amount of the 10 "leader" nutrients in the daily diet, the other 40 or so nutrients will likely be consumed in amounts sufficient to meet body needs.

One's diet should include a variety of foods because no single food supplies all the 50 nutrients, and because many nutrients work together.

When a nutrient is added or a nutritional claim is made, nutrition labeling regulations require listing the 10 leader nutrients on food packages. These nutrients appear in the chart below with food sources and some major physiological functions.

Nutrient	Important Sources of Nutrient	Some major physiological functions		
		Provide energy	Build and maintain body cells	Regulate body processes
Protein	Meat, Poultry, Fish Dried Beans and Peas Egg Cheese Milk	Supplies 4 Calories per gram.	Constitutes part of the structure of every cell, such as muscle, blood, and bone; supports growth and maintains healthy body cells.	Constitutes part of enzymes, some hormones and body fluids, and antibodies that increase resistance to infection.
Carbohydrate	Cereal Potatoes Dried Beans Corn Bread Sugar	Supplies 4 Calories per gram. Major source of energy for central nervous system.	Supplies energy so protein can be used for growth and maintenance of body cells.	Unrefined products supply fiber – complex carbohydrates in fruits, vegetables, and whole grains – for regular elimination. Assists in fat utilization.
Fat	Shortening, Oil Butter, Margarine Salad Dressing Sausages	Supplies 9 Calories per gram.	Constitutes part of the structure of every cell. Supplies essential fatty acids.	Provides and carries fat-soluble vitamins (A, D, E, and K).
Vitamin A (Retinol)	Liver Carrots Sweet Potatoes Greens Butter, Margarine		Assists formation and maintenance of skin and mucous membranes that line body cavities and tracts, such as nasal passages and intestinal tract, thus increasing resistance to infection.	Functions in visual processes and forms visual purple, thus promoting healthy eye tissues and eye adaptation in dim light.
Vitamin C (Ascorbic Acid)	Broccoli Orange Grapefruit Papaya Mango Strawberries		Forms cementing substances, such as collagen, that hold body cells together, thus strengthening blood vessels, hastening healing of wounds and bones, and increasing resistance to infection.	Aids utilization of iron.
Thiamin (B_1)	Lean Pork Nuts Fortified Cereal Products	Aids in utilization of energy.		Functions as part of a coenzyme to promote the utilization of carbohydrate. Promotes normal appetite. Contributes to normal functioning of nervous system.
Riboflavin (B_2)	Liver Milk Yogurt Cottage Cheese	Aids in utilization of energy.		Functions as part of a coenzyme in the production of energy within body cells. Promotes healthy skin, eyes, and clear vision.
Niacin	Liver Meat, Poultry, Fish Peanuts Fortified Cereal Products	Aids in utilization of energy.		Functions as part of a coenzyme in fat synthesis, tissue respiration, and utilization of carbohydrate. Promotes healthy skin, nerves, and digestive tract. Aids digestion and fosters normal appetite.
Calcium	Milk, Yogurt Cheese Sardines and Salmon with Bones Collard, Kale, Mustard, and Turnip Greens		Combines with other minerals within a protein framework to give structure and strength to bones and teeth.	Assists in blood clotting. Functions in normal muscle contraction and relaxation, and normal nerve transmission.
Iron	Enriched Farina Prune Juice Liver Dried Beans and Peas Red Meat	Aids in utilization of energy.	Combines with protein to form hemoglobin, the red substance in blood that carries oxygen to and carbon dioxide from the cells. Prevents nutritional anemia and its accompanying fatigue. Increases resistance to infection.	Functions as part of enzymes involved in tissue respiration.

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Let's evaluate the diet history example, given earlier, according to the guide's recommendations. Does it meet the recommendation for adult consumption in the milk group? By looking at the guide, you see the recommendation is 2 servings for the adult. In our patient's diet history, you observe that the patient consumed an average of 3 cups skimmed milk daily plus ¾ ounce cheese, which is almost 4 servings from the milk group. You therefore correctly determine that the patient has met the milk group recommendation.

Does the patient's typical intake meet the recommendation for the number of servings from the meat group? The daily recommendation for the adult is 4 ounces of meat, fish, poultry, dried beans, legumes, or combinations of these foods. Our patient does meet the recommended amount from the group daily as the patient consumes 1 egg (equivalent to 1 ounce meat), 2 ounces bologna, a 3-ounce beef patty, and 1 slice bacon. All these provide approximately 7 1-ounce servings.

Does the typical intake meet the recommendation for 4 servings from the fruit and vegetable group daily, remembering that at least 1 fruit should be a citrus fruit and 1 vegetable, every other day, should be a green leafy or yellow-orange vegetable? Yes, it does. How? The patient drinks ½ cup orange juice daily; orange juice is a citrus fruit juice. Also, the patient typically eats another fruit at lunch, frequently a banana. The patient also frequently eats carrots, a yellow-orange vegetable, and typically during the day consumes a lettuce salad, including tomatoes and lettuce. This meets the recommendation for 2 vegetables daily, but as a physician you should ask how frequently the patient eats carrots or some other leafy green or yellow-orange vegetable. You also should ascertain that the patient does eat these vegetables at least three times weekly and that the patient consumes a citrus fruit or citrus fruit juice daily in order to meet the recommended intake for vitamin C (ascorbic acid).

Does the patient's typical intake meet the recommendations for 4 servings from the bread, grain, and cereal group? Yes. How? The patient consumed 1 slice whole wheat bread for breakfast, 2 slices white bread and 1 bag potato chips for lunch, ½ cup mashed potatoes and 1 slice angel food cake for supper, and 3 cups popped corn from this group. This exceeds the recommendation for 4 servings from the bread group.

We have met the recommendations of the guide and should next estimate the number of kilocalories in this patient's meal pattern using Table 1–1 which indicates caloric content of food groups.

We estimate this patient typically consumes:

4 cups skimmed milk
7 ounces meat
2 fruits
2 vegetables
7 bread servings
7 fats
(2 teaspoons for breakfast as margarine on toast and for use in frying the egg, 1 for the dinner as butter on carrots and 2 in Thousand Island dressing, and 2 for the evening snack as butter on popped corn)
1 12-ounce Pepsi worth 160 kilocalories

From Table 1–1, we estimate this patient's typical kilocalorie intake as 2,025 to 2,050 kilocalories. Calculate this intake yourself to ascertain your understanding of this procedure.

The Food Groups

A discussion of each of the food groups follows, including practical information which you will frequently be asked by patients concerning the nutrient value of foods and the effects of storage, cooking, and processing on nutrients.

Milk Group

Milk is almost a perfect food. It is especially a good source of calcium, phosphorus, riboflavin, vitamin D, and protein, but it is not a good source of iron and ascorbic acid. Milk is a nutrient-stable food, except for its riboflavin content, and is today one of the cheapest sources of good nutrition.

Foods included in the milk group are those which supply a large proportion of required dietary calcium. An 8-ounce cup of milk or the amount of a food that provides the same amount

of calcium is considered 1 serving from the milk group. While foods from the milk group are good sources of protein, they are placed in this group primarily because they are excellent sources of calcium. As might be suspected, equivalent amounts of milk, cheese, and ice cream are not equal in calcium or kilocalorie content. For example, it takes more than 1 cup of ice cream and cottage cheese to provide the calcium contained in 1 cup of milk. Table 1–2 illustrates this point.

Recommendations from the milk group are 4 servings per day for teenagers, 3 per day for children, and 2 servings daily for adults. In addition to being a good source of calcium, phosphorus, and protein, milk is also an excellent source of riboflavin and is fortified with vitamin D. It is *not* a good source of iron or ascorbic acid (vitamin C).

Storage or cooking causes little loss of the nutrient content of foods in the milk group. Protein, calcium, phosphorus, riboflavin, and vitamin D are heat, cold, and pH stable. The riboflavin content, however, is unstable in light. Thus milk should never be allowed to stand in the sunlight. In glass bottles exposed to sunlight, riboflavin in milk is quickly destroyed. Use of plastic or waxed cartons and metal boxes for house-delivered milk has decreased the riboflavin loss from exposure to sunlight. Because of the variability in vitamin D content of raw milk due to exposure of the animal to sunlight, most milk has vitamin D added to the

Table 1–1 Carbohydrate, Protein, Fat, and Kilocalorie Content of Foods in Basic Food Groups

	Carbohydrate grams	Protein grams	Fat grams	Kilocalories per serving
Milk Group				
1 cup whole milk	12	8	10	170
1 cubic inch cheddar cheese	1	6	9	110
1 ounce Swiss processed cheeses	1	6	9	110
1/2 cup cottage cheese	3	16	5	120
1 cup 2% (low fat) milk	12	8	5	125
1 cup skimmed (non-fat dry) milk	12	8	0	80
Meat Group				
1 ounce beef (baby beef, chipped beef, chuck tenderloin, round, rump), lamb, pork, (ham, center), veal, poultry (without skin), fish, and shellfish	0	7	3	55
1 ounce beef (ground, corned), pork (loin, arm, Canadian bacon), liver, heart, kidney, pigs feet or ears, egg, peanut butter (2 tablespoons), 1 egg	0	7	5	73
Beans (white, pinto, lima, garbanzo, and cowpeas, 1/2 cup)	25	8	0	125
Luncheon meat (2 ounces), 1 frankfurter, 2 ounces sausage, 3 slices fried bacon	0	9	16	185
Fruit Group				
Small fresh apple, orange, pear, or peach, 1/2 cup applesauce or berries or grapefruit, 1/4 cup grape juice, 1/3 cup apple juice or cider, 2 medium apricots, 1/2 small banana, 10 to 12 large cherries or grapes (unsweetened), 4 kumquats	10	1	0	45

standard quantity of 400 IU per quart or 100 IU per cup or 8-ounce serving. Dairy products are the most significant source of vitamin D in the American diet. An external source is sunlight, although it appears that sufficient vitamin D over a lifetime is not derived from the sunlight conversion of 7-dehydrocholesterol in the skin to vitamin D_3, cholecalciferol.

Because milk is nature's most perfect food and is one of the cheapest sources of all nutrients except for iron and vitamin C, its consumption should be recommended for almost all people. When should milk not be recommended? It should not be recommended for those who have an intolerance for lactose. These people cannot consume lactose in unfermented milk or milk products without gastrointestinal distress. Because these persons still require nutrients which are supplied by milk, they should be encouraged to consume fermented dairy products in order to obtain calcium, phosphorus, riboflavin, vitamin D, and protein. Fermented dairy products include cheese, cottage cheese, yogurt, buttermilk, and sour cream.

Although there is calcium in foods other than milk and milk products (especially meat, eggs, and green leafy vegetables), it is difficult, if not practically impossible, to meet the recommended intake of calcium without consuming milk and/or milk products. Osteoporosis and osteomalacia,

Table 1-1 (continued)

	Carbohydrate Grams	Protein Grams	Fat Grams	Kilocalories per serving
Bread/Grain Group				
Bread (1 slice), 1/2 small bagel or English muffin or hotdog roll or hamburger bun, 1 tortilla, 3/4 cup unsweetened ready-to-eat cereal, 1/2 cup cooked cereal or grits, or spaghetti or macaroni or noodles, 3 cups popped corn (unbuttered), 4-6 2-inch square crackers, 1/2 cup corn, 1/2 cup green peas, 1/2 cup potatoes, 1/4 cup yams, 1 2-inch biscuit or muffin, 1 waffle or pancake	15	2	0	70
Vegetable Group				
1/2 cup all vegetables except those in bread and meat group and the following which are negligible in kilocalories: lettuce, radishes, watercress, endive, parsley, Chinese cabbage, escarole, chilies	5	2	0	25
Fat Group				
1 teaspoon margarine, oil, butter, lard, or mayonnaise, 1 Tablespoon commercial salad dressing	0	0	5	45

Table 1–2 Calcium Content of Selected Foods

Food Item	Kilocalories	Amount Needed to Supply 300 milligrams Calcium
Milk		
whole (4% milk fat)	170	8 ounces
low fat (2% milk fat)	135	8 ounces
skim (0% milk fat)	90	8 ounces
buttermilk	90	8 ounces
Yogurt, plain (skim)	122	8 ounces
Cheeses	170	1 1/2 to 2 ounces
Cottage Cheese	360	1 1/2 cups
Ice Cream	450	1 3/4 cups
Kale, spinach, turnip greens, poke, collard greens, etc.*	40 to 60	1 1/4 to 1 3/4 cups
Sour cream	570	10 ounces

*Although these green vegetables contain a substantial amount of calcium, the calcium is bound as calcium-oxalate and very little is available for gastrointestinal absorption. Greens, therefore, do not contribute substantially to the utilizable calcium pool.

bone pain, and bone fragility are long-term effects of consuming less than required amounts of calcium and vitamin D. If your patients refuse to consume milk or milk products, it is advisable to recommend they consume a calcium-vitamin D supplement equivalent to 100% of the RDA daily (800 milligrams calcium, 400 IU vitamin D).

Meat Group

The meat group supplies the greatest source of protein in the typical diet. Protein foods of highest biological value (containing all the essential amino acids in portions roughly proportional to minimum requirements) include eggs, beef, pork, chicken, and fish. Legumes, nuts, and milk products can also supply a significant amount of the day's protein needs at a substantially lower cost. Processed meats are higher in sodium content than raw meats without processing.

In the meat group, cheese can be a substitute. However, each serving of cheese can be counted in only one group. For example, if an individual eats 1 ounce of cheese, he can count this as a milk or meat serving, but not both. Additionally, legumes, nuts, and peanut butter may substitute for meats as sources of protein. With the exceptions of some types of nuts, these products and eggs are cheaper in price than most meats. In order to help a patient plan low-cost meals, the purchase of legumes, peanut butter, eggs, dairy products, and lower-cost meats should be recommended. Usually lower cost meats include ground meats, stew meat, liver, heart, kidney, tongue, flank, and brisket, which are not less nutritious yet are tougher cuts of meat and therefore require slow, moist-heat cookery. Patients and/or the food preparer in the family should be instructed to bake, simmer, stew, or boil these meats, using some water and cooking with the pan lid in place. Slow cooking should be at approximately 300° to 325° F for as long as it takes to tenderize the meat. Heart and tongue are tasty meats when served alone. Kidney, when ground in with ground beef, is a good extending meat; the ground beef decreases the strong taste of the kidney. Slow cooking of these meats is ideal, such as in a crock-pot.

Excellent recipes and low-cost meal plans including low-cost meats and meat substitutes can be purchased (in many cases they are free) from the county extension department in the patient's county seat of residence. Other assistance in food budgeting can be received for free or minimal

charge from the state department of public health and registered clinical dietitians in the area.

The amount of foods that can be used as a protein substitute for 1 ounce of meat are displayed in Table 1–3. Although peas, beans, and peanut butter contain protein, caution must be taken if these are the only sources of protein in the diet to the exclusion of meat, milk, and other dairy products. Nuts and legumes are not complete sources of protein in that they do not contain all the essential amino acids in proportions to support nitrogen balance. Therefore, they must be consumed in combinations with other foods which supply ample amounts of these essential amino acids which are limiting in legumes and nuts. The limiting amino acid in grain is lysine, in legumes is methionine, and in nuts are isoleucine and lysine.

If a patient does not consume meat, milk, eggs, or cheese, a professional nutritionist or registered clinical dietitian should be consulted. The patient may also be referred to the books in the section at the end of this module titled Resources for the Patient. Especially note *Diet for a Small Planet*. These books are appropriate if patients wish to learn how to properly utilize a vegetarian diet.

When protein-containing foods are cooked, no significant loss of nutrients occurs. When meat products are canned (canned chicken), however, and when meats are processed (luncheon meats, sausage, frankfurters), sodium is added. Thus, these foods contain significantly more sodium than do the raw ingredients. Table 1–4 compares the sodium content of several meats and other items.

Cholesterol is found in foods only of animal origin and not in fruits, vegetables, and grain products.

When patients ask about the content of cholesterol in foods, it should be remembered that it is only foods that are animal in origin, from the milk group and from the meat group, that contain cho-

Table 1–3 Foods and Kilocalories per Serving Size Equivalent to 7 Grams of Protein

Food Item	Kilocalories/Serving	Amount Equal to 7 grams Protein
Meats and Dairy Products		
Meat: beef, fish, poultry, pork, lamb, veal	50–80	1 oz (approximately 2 inch diameter with 1/4 inch thickness)
Egg	80	1 large
Cheeses	105	1 ounce (approximately 1 inch cube)
Luncheon meats, bologna, bacon, sausage	185	Bologna--2 sl Sausage--2 oz Frankfurter--1 Bacon--3 sl
Peanut butter	190	2 Tbsp
Legumes (peas, pinto beans, navy beans, red beans, lima beans, white beans, soybeans, cowpeas)	120	1/2 cup cooked

Table 1–4 Sodium Content of Selected Foods

Meat Item	Serving Size	Sodium per Serving Milligrams
Canned meats	1 ounce	300–1,000
Canned soups	3/4 cup	650–950
Frankfurter	1	540
Pretzels, thin sticks	10	470
Canned regular vegetables and canned vegetable juices	1/2 cup	250–300
Sausage	1 ounce	290
Bacon	1 slice	75
Ham	1 ounce	250
Buttermilk	1 cup	225
Tuna and salmon, regular	1/4 cup	200
Cheese, cheddar	1 ounce	200
Potato chips	10	200
Cheese, cottage	1/4 cup	160
Milk, 4%, 2%, non-fat	1 cup	125
Raw beef, pork, veal, fish	1 ounce	20–25

Table 1–5 Cholesterol Content of Animal-Origin Foods

Food	Serving Size	Cholesterol Content Milligrams
Egg, whole	1	240
Sweetbreads (thymus gland)*	1 ounce	140
Liver	1 ounce	130
Shrimp	1 ounce	45
Butter	1 Tablespoon	35
Milk, whole	8 ounces	34
Cheese, cheddar	1 ounce	30
Lobster	1 ounce	25
Chicken, with skin	1 ounce	25
Meat, fish	1 ounce	20
Oysters, clams	1 ounce	15
Vegetable oil, margarines	---	0

*According to the USDA, the thymus gland of a young animal is the only true sweetbread; in various regions of the US, however, the pancreas is often referred to as a sweetbread.

lesterol. Foods from the bread and cereal group, vegetable group, and fruit group do not contain cholesterol unless they also contain dairy products or meats. In addition, cholesterol in dairy products and meats are in these foods only when fat is present; therefore, even though skim milk is a dairy product, because it contains no fat it also contains no cholesterol. Table 1–5 contains a list of the cholesterol content of several foods highest in cholesterol.

Often you may want to know the fatty acid composition of foods. Such information may be helpful when instructing the hyperlipidemic patient to avoid saturated fats.

Table 1–6 contains information regarding the saturated and unsaturated fat content of selected foods. Note that foods of animal origin contain more saturated than unsaturated fat and that vegetables and grain oils contain almost predominantly unsaturated fatty acids. Fruits contain no fat.

Although there have been claims that animal products, specifically hormones, fat, and proteins, may be carcinogenic, these claims have not been generally accepted by the scientific community. Hormone treatment of animals with diethylstilbestrol (DES) has been curtailed, however, by the FDA. The carcinogenic properties of

Table 1–6 Saturated and Unsaturated Fat Content of Selected Foods

Food Item	Serving Size	Total Fat Gm	Total Saturated Fatty Acids Gm	Total Unsaturated Fatty Acids Gm
Bacon, cooked	2 med sl	7.8	2.5	4.4
Beef, high fat (loin, ground)	1 oz	6.7	3.3	3.2
Beef, low fat (round)	1 oz	3.3	1.6	1.6
Butter, regular	1 Tbsp	11.5	6.3	4.1
Butter, whipped	1 Tbsp	7.6	4.2	2.7
Cheddar Cheese	1 oz	9.1	5.1	3.3
Chicken, fried	1 oz	3.3	1.0	2.2
Egg, chicken	1 med	5.1	1.6	2.6
Ice Cream	1 cup	14.1	7.8	5.1
Lard	1 Tbsp	13.0	4.9	7.3
Margarine, regular	1 Tbsp	11.5	2.1	9.0
Milk, whole cow	1 cup	8.5	4.7	3.0
Milk, human	1 oz	1.2	0.6	0.5
Oils				
corn	1 Tbsp	13.6	1.4	11.0
cottonseed	1 Tbsp	13.6	3.4	9.7
olive	1 Tbsp	13.5	1.5	11.2
peanut	1 Tbsp	13.5	2.4	10.2
safflower	1 Tbsp	13.6	1.1	11.8
sesame	1 Tbsp	13.6	1.9	10.9
soybean	1 Tbsp	13.6	2.0	9.8
Peanut butter	1 Tbsp	8.1	1.5	6.1
Pork, ham	1 oz	8.7	3.1	4.4
Tuna, drained solid	1 oz	2.3	0.7	1.1

nitrates are currently being debated. The intake of nitrates and nitrites does not appear to be a carcinogenic problem because, in order to form the carcinogenic nitrosamines in vivo, secondary amines from the gut must be present (hydroxyproline and hydroxylysine), both of which are in extremely low concentrations in the human gut lumen, and the reaction is favored by a low temperature. The intake of free nitrosamines formed in foods during processing, such as in frankfurters and sausages, however, does appear to be a potential risk factor for cancer. The only reason that nutritionists are not recommending that they be removed from the market is because in the human lifespan, sufficient nitrosamines are not consumed to equal the amounts shown to be carcinogenic in experimental animals when given in large amounts over a short time.

Bread and Cereal, or Grain, Group

The bread and cereal, or grain, group supplies a large amount of the required dietary B-vitamins. Patients consuming a low-carbohydrate diet are unlikely to meet the RDA for the B-vitamins. At least 4 servings of enriched or whole grain bread or cereals are recommended each day to meet these nutrient needs.

The bread group includes breads, muffins, biscuits, macaroni, noodles, spaghetti, rice, and cereals made from a variety of grains. Four servings from the bread group are recommended daily for adults. The major nutrients supplied by this group are iron and the B-vitamins (thiamin, niacin, riboflavin, and pyridoxine). The amounts of these nutrients per serving are listed in Table 1–7.

If your patients explain that they avoid *all* foods from the bread group because of the high kilocalorie and carbohydrate content of these products, should you be concerned? Yes, you should. Why? The bread group provides the best source of B-vitamins in the diet; and when whole grains are consumed they also provide the best source of dietary fiber. It is rare that a diet can meet the RDA for B-vitamins without the consumption of 4 servings from the bread group. It should also be remembered that adult food intake should contain at least 75 to 100 grams of carbohydrate daily, even on low-calorie, weight-reduction diets, to prevent the development of ketosis. Since foods from the bread group contain 15 grams of carbohydrate per serving, these foods are excellent sources of carbohydrate in the optimal diet for weight maintenance, weight loss, and weight gain. (Four servings of bread = 60 grams of carbohydrate, plus 2 fruits equaling 20 grams of carbohydrate and 2 servings of milk equivalent to 24 grams of carbohydrate total 104 grams of carbohydrate, which is recommended daily on any well-planned diet.)

Are some breads and cereals better than others nutritionally? Frequently it is said that white bread is not as nutritionally adequate as brown or whole

Table 1–7 B-Vitamins, Iron, and Kilocalorie Content of Selected Breads and Cereals

Food	Kilocalories per/serving	Thiamin mg	Riboflavin mg	Niacin mg	Iron mg
1 slice bread					
white	70	0.06	0.05	0.6	0.6
whole wheat	70	0.06	0.02	0.6	0.5
3/4 cup rice	103	0.02	0.01	0.5	0.2
1/2 cup macaroni	78	0.10	0.06	0.75	1.3
1 cup cornflakes	95	0.10	0.02	0.5	0.5
3/4 cup ready-to-serve oatmeal	98	0.76	0.60	3.8	2.0

grain bread because the vitamins are removed during the milling phase in the production of white flour. Even though nutrients are removed and then replaced during the later processes of white flour production, questions arise as to the nature of these nutrients. Many people believe "synthetic" vitamins are not as "good" as "natural" vitamins. Nothing could be further from the truth: the vitamin content of white bread is equivalent to that of brown bread, as has been shown in Table 1-7. Rice and pastas (macaroni, noodles, spaghetti) are also usually enriched to the nutrient levels prior to processing. Enriched breads, cereals, rice, and pastas are as nutritionally adequate as brown bread and other whole grain products, with the exception of fiber content. During the milling process the bran is removed, and with its removal so too is fiber. Fiber is not usually replaced during the production of white bread and pasta unless it is added as cellulose or lignin. These products are labeled as "high fiber" or "fiber added" products.

What does fiber contribute to the diet? Is it a dietary essential? Fiber contributes bulk to the diet and in the gut simply acts as a sponge, absorbing water from the gut and producing a softer stool than if no fiber were present. It is, however, *not* a dietary essential; and the anticarcinogenic, anticholesterolemic, and gallbladder disease-inhibiting properties attributed to it by some researchers have yet to be proven. When viewing Table 1–8 showing the crude fiber content of several foods, remember that dietary fiber figures are two to five times higher than the actual crude fiber content.

Table 1–8 Total Dietary Fiber in Selected Vegetables, Fruits, and Wheat Products

Food	Total Dietary Fiber (grams/100 grams fresh weight)
Cabbage, cooked	2.83
Carrots, cooked	3.70
Peas, frozen, raw	7.75
Tomato, raw	1.40
Apple, flesh only	1.40
Banana	1.75
Pear, flesh only	2.44
Plum, raw, flesh and skin	1.52
Strawberry, raw	2.12
White flour (72%)	3.45
Brown flour (90-95%)	8.70
Wholemeal flour	11.00
Bran	48.00

Adapted from Southgate, D.A.T.: "The Definition and Analysis of Dietary Fibre." *Nutrition Reviews* 35:31-37, 1977.

Fruit and Vegetable Group

To meet the RDA for vitamin A and ascorbic acid, it is imperative that a person consumes green leafy or deep yellow or orange vegetables every other day and a citrus fruit or juice or large amounts of other foods (such as potatoes, broccoli, or tomatoes) high in ascorbic acid daily.

The recommendation for daily intake of fruits and vegetables is 4 ½-cup servings. To meet the recommendation, it should be noted that dark green vegetables such as greens, spinach, or kale or yellow vegetables such as carrots, squash, sweet potatoes, or corn should be consumed at least every other day as a source of vitamin A. Citrus fruits, tomatoes, potatoes, broccoli, or other greens should be eaten daily to supply vitamin C.

When you have a patient's dietary intake in front of you and must evaluate it for vitamin C content, you can safely assume that the recommended allowance for vitamin C will not be met unless the patient consumes at least ½ cup citrus juice or a small whole citrus fruit or 1 cup potatoes or ½ cup greens or broccoli or 2 large tomatoes daily. Fruits other than citrus fruits, even if 4 servings are consumed, do not meet the recommended amount of vitamin C intake alone unless coupled with the high vitamin C-containing foods identified in this paragraph.

Is vitamin C lost in cooking or storage? Early studies indicated that vitamin C was a very labile vitamin, readily oxidized in light and air. More recent and accurate studies, however, indicate that vitamin C is not as labile as was once thought. Cooking fruits and vegetables for a short time until tender preserves a large percentage of the water-

soluble vitamins. A small amount of water (½ cup or less) should be used at a boiling temperature. Microwave cooking of fruits and vegetables results in a slight decrease in nutrient quantity; neither canning nor freezing of fruits and vegetables appreciably affects nutrient quality unless they are boiled for a long time when canned.

With the recent world economic conditions, many people have begun planting their own gardens and preserving food during the plentiful season for use during winter months. Therefore, during the past several years we have seen an increase in home canning and home freezing practices. A return of several vegetables from yesteryear has also been seen; remember the "old," now "returned," Jerusalem artichoke! Although you should not be the person who tells others "how to" grow and preserve foods, you should know a few basic facts and know to whom you should refer them for more detailed information.

If you have patients who are gardeners, suggest that they grow foods following directions on seed or plant packages. Suggest that when they can vegetables they use a pressure canner (do not use the hot water baths that were once used); correct pressure canning creates an airpoof seal on cans that prevents botulism. Hot water and even boiling baths are not safe. Since many of today's varieties of vegetables are "low-acid," whereas the acidity of some vegetables of yesteryear was higher, safety in canning *requires* pressure cookers (pressure canners). Request that patients discuss proper canning and freezing methods with a registered clinical dietitian in a local hospital or nursing home or with a county extension specialist. Blanching (boiling for a short time) fruits and vegetables prior to freezing is essential; you should recommend that boiling be done for a short time (three minutes) and that freezing be done in an airtight container, keeping all foods away from cold, dry freezer air which causes an ugly color, bad taste, and poor texture characteristic of "freezer burn."

The use of "organic gardening" methods, which many believe will improve the vitamin content of food, is not a wise practice.

Organic gardening may not only result in decreased crop production due to lack of sufficient fertilizer, but use of organic composts add to the high possibility of introducing enteric bacteria. There is no increase in vitamin content of foods grown by organic gardening methods when compared with the nutrient content of foods grown in inorganically fertilized soil; the risks highly outweigh any possible benefits.

The basic four food groups serve as the foundation of an adequate diet. The minimum number of servings in the amounts recommended for each age group provide the RDA for all nutrients with two exceptions — kilocalories for all age groups and iron for women during the reproductive period. Calories supplied by the recommended servings are approximately 1,000 to 1,200 and many individuals have a basal energy expenditure greater than this amount.

To Meet Energy Needs

To meet demands for physical activity and to maintain desirable weight, additional foods may be added from three sources including the following:

1. Additional servings from the four food groups.

2. Fats and oils including butter, fortified margarine, cream cheese, cream, vegetable oils and shortening, salad dressing, bacon grease, and fatback. When these foods are added to the diet, the major addition is kilocalories; in fortified products such as margarines, small amounts of the fat-soluble vitamins A and D are added.

3. Sugars such as jam, jelly, honey, and syrup add kilocalories with little amounts of additional nutrients. Molasses, however, does provide iron but is not a significant source of iron unless large amounts of it are used daily (1 Tablespoon molasses provides 3.2 milligrams iron).

Iron Requirements

The iron requirement of women during the reproductive years is so high that the additional foods selected for kilocalories should be chosen for their iron content as well. Since pure fats and sugars contain no iron, women should receive their intake of iron from foods high in iron, including those shown in Table 1–9.

Because it is almost impossible to meet the recommended iron intake for women with foods alone, recommendation for iron supplementation during the reproductive years is consistent with good nutritional and medical knowledge and practice. Use of brand name formulas is not essential as iron can be purchased much cheaper in non-brand-name formulas by simply reading labels and purchasing those that contain 100% of the RDA per tablet as ferrous sulfate. Ferrous sulfate is the most recommended form of iron due to its readily absorbable form.

Food Choices and Your Patient's Ethnic Background

As a physician, you may be treating patients from a variety of ethnic backgrounds. Tables 1–12 through 1–16 in Appendix B at the end of this module show characteristic foods consumed by various ethnic groups. When you elicit dietary histories from these people, you will note that they frequently eat differently from the recommendations of the Daily Food Guide. These practices may be acceptable when the overall diet is viewed and the nutrient intake is calculated.

Although these tables indicate the typical foods ethnic groups eat, there are a few additional items you should note when discussing food intake with people of various ethnic groups.

For the Black American

1. Hot breads are served at nearly every meal and baker's yeast breads are not popular for the southern black.
2. Corn and rice are common sources of carbohydrate for southern blacks.
3. Breakfast patterns frequently include grits in some form. If eggs and bacon or another form of pork are available, they are served with the grits. Hot breads, biscuits, muffins, and cornbread take the place of yeast bread at most meals.
4. There is a preference for vegetables that have been cooked a long time and often with fatback; the use of pot liquor conserves the loss of some nutrients. Fatback adds kilocalories.
5. Cornbread is traditionally served with greens.
6. Sweet potatoes and squash are often used in pies as the person from New England uses pumpkins.

Table 1–9 Iron Content of Selected Foods

Item	Serving Size	Iron Content Milligrams
Liver, pork	3 ounces	17.0
Liver, beef	3 ounces	7.3
Dried apricots	100 grams (17 halves)	5.5
Beef	3 ounces	3.0–3.5
Green leafy vegetables	1/2 cup	1.0–3.3
Blackstrap molasses	1 tablespoon	3.2
Dried beans and peas	1/2 cup	2.5
Poultry	1 ounce	0.6–2.0
Breads, cereals, enriched	1 slice or 1/2 cup	0.6–2.0
Egg	1 medium	1.1
Potatoes	1/2 cup	0.6
Fish	1 ounce	0.1–0.3

7. Since large amounts of fats and carbohydrates are consumed, adequate or more than adequate kilocalories are usually provided. Iron, calcium, vitamin A, and vitamin C have been found inadequate in the dietary intake of many southern blacks.
8. Salt and salty foods are traditionally eaten and used in the cooking process; the typical black person's diet is usually high in sodium and often in fat.

For the American Indian

1. Because of extensive food acculturation, it is difficult today to identify a typical Indian food pattern. Many of the traditional foods, however, have religious and ceremonial significance and are frequently eaten on festive days. Since most of these foods are nutritionally rich, they should be encouraged.
2. Surveys of various tribes indicate mild to marked deficiencies in kilocalories, calcium, riboflavin, and vitamins A and C. Growth of children is below the norms for other North American children. Infant mortality rates are three times that of the general population; the incidence of tuberculosis seems to be an important factor.

For the Mexican-American

1. Mexicans freely use many varieties of beans, especially pinto beans, as well as rice, potatoes, peas, and some vegetables.
2. Chili, a variety of pepper, is also popular since the chili plant is sacred to the Mexican.
3. Mexicans use little meat and practically always cook it with vegetables, especially tomatoes.
4. Chili con carne, a favorite meat dish, consists of beef seasoned with garlic and chili peppers.
5. Tamales are made of cornmeal and ground pork, highly seasoned and rolled in cornhusks and steamed.
6. Tortillas are made with ground whole corn and served as bread. Enchiladas are tortillas filled with cheese, onion, and shredded lettuce. Tacos are enchiladas plus meat and sauce.
7. Since little milk is used, except cheese, calcium intake is usually low. Vitamin A deficiency is prevalent among Mexican children.

For the Puerto Rican-American Living in Northern United States

1. Puerto Ricans in New York City and other urban areas are often among the lower economic groups because they are frequently unskilled laborers. Therefore, they frequently have inadequate cooking and refrigeration facilities.
2. They should be encouraged to use more milk and cheese and cheaper cuts of meat to supplement the protein at meals when rice and beans are served.
3. Rickets and malnutrition are common in children; a registered clinical dietitian should be contacted for advice when instructing this ethnic group on nutritious meals.

For the Italian-American

1. Bread is an essential part of Italian meals.
2. In general, northern Italians have better food habits than those from the South. Encouraging the use of milk and meat might be important for southern Italians.
3. Most Italians eat a light breakfast, often coffee for adults and milk for children with some bread. Some eat the main meal at noon, others at night.
4. Ethnic foods are usually cooked with large amounts of oil and salt; therefore, Italian-Americans' intake of fat and sodium is generally high.

For the Chinese-American

1. The quantity of meat eaten by the Chinese is small and is usually served with vegetables. Vegetables are cut into small pieces in conformity with an ancient law laid down by Confucius.
2. Chinese-Americans do drink milk and eat cheese, even though these products are rarely consumed in China.
3. Chinese, Japanese, and Filipino people consume extraordinarily large amounts of sodium which is a frequent problem when they must omit salt from their diet. Soy sauce, salty snack foods, salty pickles, smoked fish, and fish sausage are foods with high sodium content typically eaten by Orientals.

For the Jewish

1. Meats allowed include those from quadrupeds with cloven hooves that chew a cud (cows, sheep, goats, deer); poultry allowed includes chicken, turkey, goose, pheasant, and duck. All meats and poultry must be freshly slaughtered according to prescribed ritual and soaked in salted water to remove all trace of blood; this process, called koshering, adds large amounts of sodium.
2. Meat and milk are never combined in the same meal, nor even cooked in the same utensil.
3. Eggs, fruits, vegetables, cereals, and all other foods may be used without restrictions.
4. Pastries and cakes are typically rich in fat and sugars.
5. Most vegetables are cooked with meat and are often served in soup. Borscht is a soup made with "sour salt" (tartaric acid) and vegetables with sour cream added.
6. Dried fruits and fresh fruits are popular.
7. Fish is eaten often; gefilte fish is a delicacy. Chicken is considered almost an essential for the Sabbath evening meal.
8. Orthodox Jewish children may not receive adequate calcium intake due to low milk consumption.

Evaluating Food Intake Using Food Composition Tables

As a physician, there may be times that (1) you or your patient wants to evaluate the nutritional adequacy of the patient's dietary intake in more depth than by using the recommendations of the Daily Food Guide, or (2) you or your patient wants to know a specific nutrient content for a particular food — for example the potassium content of a banana. The following 3 references contain this type of information, and it would be wise for you to have one of these in your office for ready reference:

1. Church, C.F. and Church, H.N.: *Food Values of Portions Commonly Used*, Philadelphia, PA, Lippincott, 1975. ($7.00)
2. USDA Handbook No. 456, *Nutritive Value of American Foods in Common Units*, Washington, DC, Agricultural Research Service, 1975. ($5.00 or may be free from your US congressman)
3. USDA Home and Garden Bulletin No. 72, *Nutritive Value of Foods*, Washington DC, Agricultural Research Service, 1977. (Free from your US congressman)

A brief form of this information, called the Food Composition Table for Short Method of Dietary Analysis (3rd Revision), is an excellent fingertip library reference for you and is found in Appendix A. An additional fingertip piece good for use with patients is a 2-page guide entitled "What Is a Good Diet" (see Appendix C–1) and "Who Needs Vitamin and Mineral Supplements?" (see Appendix C–2).

The Recommended Dietary Allowances

To educate the layperson in nutrition, it has been customary to categorize foods into specific groups such as the basic four food groups discussed earlier in this module. Translating the RDA into a meaningful system that could be used in planning diets was the purpose behind the development of food groups. Although the food guide as a concept is a simple and effective means of communicating information about nutrition to the general public, the food guide alone may be too simple for many who desire more definitive information.

The RDA are not requirements. They are levels of intake of essential nutrients considered in the judgment of the food and nutrition board of the National Academy of Science on the basis of available scientific knowledge to be adequate to meet the known nutritional needs of practically all healthy persons.

The nutrient allowances in the RDA were developed based on scientific evidence of nutrient requirements. To date there is limited information about exact nutrient requirements, about the variability of requirements between persons, and about factors which influence the utilization of ingested nutrients. Allowances of some of the nutrients could not be estimated directly from available scientific knowledge. Thus, in determining the estimated allowances, the Food and Nutrition Board

tended to err on the positive side. Generally, in establishing the RDA, the estimated average requirement of a nutrient, with the exception of energy, was set at 2 standard deviations greater than the mean. Therefore, the allowances were planned to supply a large enough margin above average body requirements to anticipate the variations which may occur in practically *all healthy individuals in the general population*.

The various protective mechanisms of the body are such that if the RDA for a nutrient is not met on a particular day, a surplus consumed shortly thereafter will compensate for the inadequacy. Thus, it is more acceptable to estimate dietary adequacy by averaging intakes of nutrients over a five- to eight-day period than for a one-day period.

Conditions which require adjustments in allowances include the following:

- Illness and rehabilitation.
- Prematurity.
- Intestinal infestation.
- Inherited metabolic disorders.
- Other trauma and stresses.
- Use of medications requiring special dietary and therapeutic measures.

Infections, even mild ones, increase metabolic losses of nitrogen, fluid, and a number of vitamins and minerals. Poor appetite during illness may lead to curtailed food intake as well. During both the illness stage and the recuperation stage, the patient needs to eat. Stimulation of an ill person's appetite is not easy, and loss of appetite is easier to prevent than to cure. Because the RDA were not established for ill patients, they do not apply to these persons. When appetite is good or can be stimulated so the patient is recuperating and consuming a well-balanced, varied diet, vitamin and mineral supplementation is not usually necessary; yet a one-a-day multiple vitamin and mineral supplement supplying 100% of the RDA per tablet is not harmful and provides an additional measure of nutrient adequacy.

Infestations by intestinal parasites endemic to some parts of the US may reduce the amounts of certain nutrients available to the host. Such infestations may require medical attention; where reinfection is generally continuous, additional food and nutritional supplements compensate in part for nutrient losses. These conditions frequently occur in impoverished neighborhoods, particularly with young children.

The RDA are deliberately set high so that a person who habitually consumes less than the recommended amounts of some nutrients is not necessarily deficient for those nutrients. However, since the requirements of individuals are not known, it must be assumed that the further habitual intake falls below the RDA standard for a particular nutrient, and the longer the low intake continues, the greater is the risk of clinical and subclinical deficiencies.

Most nutrients are tolerated well in excess of the RDA by even as much as two to three times, and a substantial proportion of the population commonly consumes in excess of the RDA for several nutrients without evidence of adverse effects. However, an excessive intake of energy is highly undesirable and high intakes of a few nutrients, such as vitamins A and D, ascorbic acid and niacin, iron and other minerals, can be toxic.

A healthy person who consumes the RDA need not take nutritional supplements; the RDA are useful to you in educating healthy persons as to the use or nonuse of nutritional supplements.

Food Labels and Nutrient Information

As physicians, you can help patients educate themselves with regard to nutrient content of foods and planning well-balanced meals by encouraging them to read food labels.

With the exception of fresh fruits, fresh vegetables, meats, and a few packaged items, most foods sold today in grocery stores have labels which identify their nutrient content. By law, labels must give the following nutrient information per serving:

- Serving portion.
- Number of servings per container.

- Calories (kilocalories per serving).
- Protein (grams per serving).
- Carbohydrate (grams per serving).
- Fat (grams per serving).

Also, nutrient content as a percentage of the US Recommended Daily Allowances (US RDA) must be given for the following nutrients:

- Protein
- Vitamin A
- Vitamin D
- Thiamin
- Riboflavin
- Niacin
- Calcium
- Iron
- Phosphorus
- Magnesium
- Copper
- Zinc

Nutrient information for sodium and cholesterol is optional; however, it is included on many food labels. The US RDA are different from the RDA and were developed by the FDA for the nutrient content of labeling.

As persons read food labels they can quickly learn about the nutrient content of foods. Appendix E includes a list of the major nutrients known to be essential to health and the foods that are the principal sources of these nutrients in human food intake. Use Appendix E when you want to recommend specific foods to patients to increase the intake of a particular nutrient. To learn more about food labeling, you and your patients can contact county extension departments for well-written, free brochures.

Food Fallacies

You should recognize that food fallacies abound! Many fallacies about food and nutrition exist because they have never been scrutinized and put to question. The physician and clinical dietitian who have studied biochemistry should step forth to stop many myths and to halt the propagation of those that appear to develop almost daily. Table 1–10 presents (1) a few common fallacies believed by many people, and (2) the facts that disprove or otherwise do not support the fallacy.

Table 1–10 Food Facts and Fallacies

Fallacy: White eggs are more nutritious than brown.	Fact: The nutritive value of an egg is not related to the color of the shell. Color is determined by the breed of the hen.
Fallacy: Raw eggs are better for you than cooked eggs.	Fact: The extent to which cooking influences the digestibility and nutrients of the egg has been the subject of much investigation. The cooking methods influence the rate of digestion but only slightly affect the use of the nutrients by the body. If eaten in large quantities, raw egg whites can cause a deficiency of one of the B-vitamins, biotin. Raw eggs may carry a bacteria (Salmonella) which causes a form of food poisoning.
Fallacy: Fertile eggs contain greater nutritive properties than unfertile eggs.	Fact: Fertile eggs provide the same nutrients as non-fertile eggs. There are only two sure tests for egg fertility--a high powered microscope or incubation for 36 hours. Fertile eggs spoil (deteriorate) much more rapidly than unfertile ones, therefore, they must be absolutely fresh to prevent contamination by decomposition.
Fallacy: Oysters, raw eggs, and rare or raw meat increase sexual potency.	Fact: These foods, as well as all others, contribute toward health and well-being but have no special properties to increase sexual potency.

Fallacy: Gelatin is an excellent source of protein and will strengthen the fingernails.	Fact: Unlike eggs, milk, or meat, gelatin is an incomplete protein and does not contain all of the amino acids needed for growth, repair, and maintenance of the body--despite its animal origin. There are differences of scientific opinion as to whether protein in any form improves fingernails.
Fallacy: Vitamin E in massive doses will increase virility and prevent heart disease, miscarriages, formation of scar tissue, and cancer.	Fact: Vitamin E functions as an antioxidant which helps prevent oxygen from destroying other substances. Misleading claims that vitamin E supplementation of the ordinary diet will cure or prevent such human ailments as sterility, lack of virility, abnormal termination of pregnancy, heart disease, muscular weakness, cancer, ulcers, skin disorders, and burns are not backed by sound experimentation or clinical observations. Some of these claims are based upon deficiency symptoms observed in other animals. Studies over a period of many years attempting to relate these symptoms to vitamin E in vegetable oils, cereal grains, and animal fats have shown that a deficiency in humans is unlikely.
Fallacy: Large doses of vitamin C will cure the common cold.	Fact: The therapeutic claims of vitamin C should be questioned until further scientific evidence is available. In addition, possible adverse effects of excess intake of vitamin C for prolonged periods of time have not been determined.
Fallacy: The nutritive value of foods raised on "depleted" soil is poor.	Fact: The quality of soil influences the quantity of the crop more than the nutritive value. Slight variations in the nutritive value of crops can be related to the soil. However, experiments have shown that the nutritive value of a given crop is influenced more by its genetic make-up than by the fertility of the soil. Crops grown on seriously depleted soil will be poor in quality--shriveled, blemished, small, discolored.
Fallacy: Vitamin A will relieve acne.	Fact: Vitamin A has a vital role in the formation and maintenance of healthy functioning epithelial tissue of which includes not only the skin but also the mucous membranes lining the mouth and eyes. The use of oral vitamin A in the treatment of acne has not been shown to be effective; in fact, large doses have been shown to be associated with pseudotumor cerebri.
Fallacy: It is dangerous to leave food in a can that has been opened.	Fact: It is safe to keep the food in the original can after it has been opened. It is important to cover the can and to keep the food cool. A few acid foods may dissolve a little iron from the can, but this is not harmful or dangerous to health. It may cause some discoloration of the food product.

Fallacy: Raw sugar is more nutritious than refined sugar.	Fact: Raw sugar is essentially the unrefined sugar crystals extracted from sugar cane or sugar beets. The traces of minerals in raw sugar add little to the total day's needs.
Fallacy: Blackstrap molasses is good for anemia and rheumatism.	Fact: Blackstrap molasses does contain calcium, iron, and most of the B vitamins. The iron content of one tablespoon blackstrap molasses is approximately 3.2 milligrams; this is within the range of iron content of 2/3 cup dried beans or peas. A 3-oz cooked serving of beef has 3.0 to 3.5 mg of iron; 3 ounces of beef liver has 7.3 milligrams of iron. While not a wonder food, blackstrap molasses along with other good sources of iron can help alleviate and prevent iron-deficiency anemia. There is no scientific evidence indicating any benefit from blackstrap molasses in the treatment of rheumatism.
Fallacy: Vinegar and honey can help cure rheumatism and arthritis.	Fact: Honey is a sugar that is comparable to table sugar in composition. Honey, alone or with vinegar, adds only calories to the diet. Neither item has an effect on rheumatism or arthritis. In fact, too many calories will add weight, which indirectly can create greater pain.
Fallacy: Lecithin is a valuable antidote for many diseases such as heart disease, dry skin, nervous disorders, and arthritis.	Fact: Lecithin is a phospholipid which contains choline; it is found in egg yolks, soybeans, meats--especially liver--and whole grains. Phospholipids help transport fats in the blood stream. Despite claims from health food enthusiasts, there is no proof that lecithin can reduce elevated blood cholesterol associated with risk for heart disease. Large doses of lecithin have not been proven to have any curative effect.
Fallacy: Margarine contains fewer calories than butter.	Fact: This is not true. The caloric content is the same in butter and margarine.
Fallacy: Green glass jars keep food from spoiling.	Fact: "Keeping" qualities of food are dependent upon the sterilization of the product and the container rather than on the color of the glass. The fact that clear glass jars are in common use today suggests that they are satisfactory.
Fallacy: In cooking "poke" or other greens, it is necessary to change the water three times.	Fact: It is not a good practice to change the water when cooking green, leafy vegetables. All greens should be thoroughly washed before being cooked. The least amount of water used in cooking green, leafy vegetables permits the greatest saving of vitamins and minerals.

Fallacy: Sauerkraut canned in glass jars with metal caps becomes poisonous.	Fact: The use of a metal cap has no relation to spoilage. Improper canning methods result in spoilage by bacterial contamination. Corrosion of the inside of the can frequently occurs with certain acid fruits and vegetables, such as grapefruit, tomatoes, sauerkraut, asparagus and pumpkin. Extensive corrosion usually indicates that the product has been packed for a year or more. Corrosion often imparts a metallic taste to the product, but it is not a menace to health.
Fallacy: Milk should never be given to a patient with a fever.	Fact: The patient's temperature has no bearing on his ability to take milk.
Fallacy: Milk is constipating.	Fact: The statement that milk is constipating is not based upon fact. The only objection to milk is that the patient who takes it in large quantities is less likely to eat other foods in amounts sufficient to give necessary bulk. It is proper to give milk to constipated patients, provided they obtain sufficient crude fiber from other foods.
Fallacy: Yogurt and brewer's yeast are required for a good diet.	Fact: Yogurt and other fermented milks are good foods, but they have none of the mysterious health-giving virtues which are attributed to them by some people. Yogurt costs more than whole milk. Yogurt is made from whole milk with varying amounts of added milk solids. No difference has been demonstrated between the nutritional value of fresh and fermented milks which contain equal concentrations of milk fat and nonfat milk solids. Brewer's yeast is an excellent source of protein of high biological value and of the B-complex vitamins. However, persons who eat eggs, meat, and whole-grain or enriched cereals or bread do not need to supplement their diet with yeast.
Fallacy: Special low-calorie breads should be used in reducing diets.	Fact: The basic ingredients of bread cannot be varied to any great extent if a palatable product is made.
Fallacy: Toast has fewer calories than bread.	Fact: Toast is bread that has been dried and browned. The water content is decreased, but this does not change the caloric content per slice because water has no caloric value.
Fallacy: Sugar is not as fattening as starch.	Fact: Weight for weight, sugar and starch have essentially the same caloric value.

Fallacy: Raw foods in the diet of a nursing mother are harmful to the infant.	Fact: Seldom does a particular food in the maternal diet disturb the breast-fed infant. There may, of course, be cases of individual intolerance, but these should be treated as individual and not general. The normal nursing mother needs a generous, varied diet, high in protein, and which includes raw fruits and vegetables.
Fallacy: Cravings for certain foods means the body needs them.	Fact: Cravings for foods do not represent the need for them but rather reflect the associations people have for certain foods. The family of a two-year-old girl went away on a trip and left her with a friendly woman whom the child knew only slightly. While they were gone, the little girl fell and twisted her shoulder, with some resulting pain for two or three days. In that time, the child refused practically all food offered her, except breakfast and cookies. She begged for beer until the motherly woman finally gave in and gave her a few sips from time to time. No explanation of a physiologic basis will suffice for this--nor is it needed. She wanted the beer because her father drank a bottle of beer when he came home in the evening or when he read--and at these times, he held her on his lap and comforted her. He could make her hurt go away, and she sought this symbol of him when his absence coincided with her pain.

From *Food Facts Talk Back*, 1975. Used with permission of the publisher, the American Dietetic Association.

Summary

A well-balanced diet consists of a variety of foods chosen from the milk, meat, fruit and vegetable, and bread and cereal groups. A vegetarian diet which omits one or two of these groups can be nutritionally adequate with some knowledge of proper menu planning. When the recommendations of the Daily Food Guide are met, healthy persons consume protein, vitamins, and minerals which are adequate for maintaining health. Vitamin and mineral supplements are not necessary on a varied diet which includes milk, meat, fruits, vegetables, breads, and cereals.

Food and nutrition fallacies abound. Knowledge that no one food or nutrient has magical properties will help the physician dispel some of the faddist's beliefs.

Test Your Knowledge

This is a test of your ability to evaluate the adequacy of a patient's diet and, if necessary, recommend foods which would more than likely be acceptable to the patient, taking into account his ethnic background.

Patient J.A. is a poor, white, Appalachian adult man who typically consumes the following daily intake:

Breakfast	**Lunch**	**Dinner**
Oatmeal, cooked, 2 c	Ham hock, 2 oz	Macaroni and tomatoes, 1½ c
Milk, fresh, raw, ½ c	Dried beans, cooked, 1 c	Biscuit, 2 lg
Molasses, 1 Tbsp	Mustard greens, ½ c	Butter, 1 Tbsp
Biscuits, 2 lg	Cornbread, 2 lg sq	Sweet potato pie, ⅛ pie
Butter, 1 Tbsp		Buttermilk, 1 c

In the first column, list those nutrients for which you anticipate the patient's intake will be low. In the second column, list those foods which you would recommend to improve the intake, taking into account J.A.'s ethnic background.

	Low Intake	Recommended Foods
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____

The answer to this assessment is on page 26.

Resources for the Physician

Alfin-Slater, R., et al.: "Dietary Answers to Common Problems." *Patient Care*, 12(6):42, 1978.

Alfin-Slater, R., et al.: "Helping Patients Learn to Eat Right." *Patient Care.*, 12(6):120, 1978.

Alfin-Slater, R., et al.: "Nutrition in Everyday Practice." *Patient Care*, 12(6):76, 1978.

Colin, N.: "Nutrition Labeling." *Nutrition Today*, 29:No.10, 1976.

Day, H.G.: "Food Safety, Then and Now." *Journal of the American Dietetic Association*, 69(3):229, 1976.

Deutsch, R.: *The New Nuts Among the Berries*. Palo Alto, CA, Bull Publishing, 1977.

Jukes, T.H.: "Current Conceptions on Nutrition: Food Additives." *New England Journal of Medicine*, 297:427, 1977.

Morgen, S. and Allen, L.H.: "What to Look for in the Nutritional Examination." *Consultant*, 16:43, 1976.

National Academy of Sciences, National Research Council, and Food and Nutrition Board: *Recommended Dietary Allowances*, 9th ed. rev., 1980.

Pyke, N.: *Food Service and Technology*. London, John Murray, 1970.

Schneider, H.A., Anderson, C.A. and Cousin, D.B.: *Nutritional Support of Medical Practice*. Hagerstown, MD, Harper & Row, 1977.

Southgate, D.: "The Analysis of Dietary Fiber.": In *Fiber in Human Nutrition*, Spiller, G.A., and Amen, R.J. (eds.), New York, Plenum Publishing, 1976.

United States Government, Title 21, Code of Federal Regulations, Part 121, *Food Additives*. Washington, DC, U.S. Government Printing Office, 1978.

Williams, R.J.: *Physicians Handbook of Nutritional Science*. Springfield, IL, Thomas, 1975.

Resources for the Patient

Alfin-Slater, R. and Aftergood, L.: *Nutrition for Today.* Dubuque, IA, William C. Brown, 1977. ($1.95)

Barrett, S. and Knight, G. (eds.): *The Health Robbers.* Philadelphia, PA, George F. Stickly Publishing, 1976. ($10.00) (A special publication of the Lehigh Valley Committee Against Health Frauds)

Deutsch, R.: *The New Nuts Among the Berries.* Palo Alto, CA, Bull Publishing, 1977. ($4.95)

Ewald, E.B.: *Recipes for a Small Planet.* New York, Ballantine, 1975. ($1.95)

Kotschevar, L.H. and McWilliams, M.: *Understanding Foods.* New York, Wiley, 1969. ($12.00)

Kraus, B.: *Guide to Fiber in Foods.* New York, New American Library, 1975. ($1.50)

Labuza, T.P.: *Food and Your Well Being.* St. Paul, MN, West Publishing, 1977. ($9.95)

Lappé, F.M.: *Diet for a Small Planet.* New York, Ballantine, 1975. ($1.95)

McWilliams, M.: *Food Fundamentals,* 2nd ed. New York, Wiley, 1974. ($13.95)

Mayer, J.: *A Diet for Living.* Mount Vernon, NY, Consumers Union, 1975.

Meredith Corp. and Deutsch, R. (eds.): *The Family Guide to Better Food and Better Health.* New York, Bantam Books, 1973. ($2.25)

Roe, D.: *A Plague of Corn.* Ithaca, NY, Cornell University Press, 1973. ($14.50)

Stare, F.J. and McWilliams, M.: *Nutrition for Good Health.* Fullerton, CA, Plycon, 1974. ($7.95)

Stare, F.J. and Whelan, E.M.: *How to Eat Crackers in Bed and Keep Slim.* North Quincy, MA, Christopher Publishing, 1978. ($9.75)

Stare, F.J. and Whelan, E.M.: *Panic in the Pantry.* New York, Atheneum, 1977. ($3.95)

United States Government, Superintendent of Documents, *Composition of Foods.* Handbook 456, Washington, DC, U.S. Government Printing Office, 20402, 1975. ($5.00)

White, P.L. and Selvy, N.: *Let's Talk about Food.* Chicago, IL, Follett, 1975. ($6.95)

Answer

Very likely, Mr. J.A.'s dietary intake is adequate in all nutrients. Total kilocalories are approximately 2,400. Protein needs are met by milk, buttermilk, ham, beans, and grains. Vitamin A and ascorbic acid needs are met by intake of greens, sweet potatoes, and tomatoes. Calcium and vitamin D intake are adequate through consumption of milk, buttermilk, grain products, and sweet potato pie. Greens probably contribute little absorbable calcium. Intake of the B-vitamins should be adequate if whole grains or enriched flours are used in the oatmeal, biscuits, and cornbread.

Appendix A

Table 1–11 Food Composition Table for Short Method of Dietary Analysis (3rd Revision)

Food and Approximate Measure	Weight gm	Food Energy Cal.	Protein gm	Fat gm	Carbohydrate gm	Calcium mg	Iron, mg	Vitamin A Value IU	Thiamine mg	Riboflavin mg	Niacin mg	Ascorbic Acid mg
Milk, cheese, cream; related products												
Cheese; blue, cheddar (1 cu in., 17 gm),												
cheddar process (1 oz), Swiss (1 oz)	30	105	6	9	1	165	0.2	345	0.01	0.12	trace	0
cottage (from skim) creamed (½ cup)	115	120	16	5	3	105	0.4	190	0.04	0.28	0.1	0
Cream; half and half (cream and milk) (2 Tbsp)												
For light whipping add 1 pat butter	30	40	1	4	2	30	trace	145	0.01	0.04	trace	trace
Milk; whole (3.5% fat) (1 cup)	245	160	9	9	12	285	0.1	350	0.08	0.42	0.1	2
fluid, nonfat (skim) and buttermilk (from skim)	245	90	9	trace	13	300	trace	---	0.10	0.44	0.2	2
milk beverages, (1 c) cocoa, chocolate drink made with skim milk. For malted milk add 4 tbsp half and half (270 gm)	245	210	8	8	26	280	0.6	300	0.09	0.43	0.3	trace
milk desserts, custard (1 c) 248 gm ice cream (8 fl oz) 142 gm		290	8	17	29	210	0.4	785	0.07	0.34	0.1	1
cornstarch pudding (248 gm) ice milk (1 c) 187 gm		280	9	10	40	290	0.1	390	0.08	0.41	0.3	2
White sauce, med (1/2 c)	130	215	5	16	12	150	0.2	610	0.06	0.22	0.3	trace
Egg; 1 large	50	80	6	6	trace	25	1.2	590	0.06	0.15	trace	0
Meat, poultry fish, shellfish, related products												
Beef, lamb, veal; lean and fat, cooked inc. corned beef (3 oz) (all cuts)	85	245	22	16	0	10	2.9	25	0.06	0.19	4.2	0
lean only, cooked; dried beef (2+ oz) (all cuts)	65	140	20	5	0	10	2.4	10	0.05	0.16	3.4	0
Beef, relatively fat, such as steak and rib, cooked (3oz)	85	350	18	30	0	10	2.4	60	0.05	0.14	3.5	0
Liver: beef, fried (2 oz)	55	130	15	6	3	5	5.0	30,280	0.15	2.37	9.4	15
Pork, lean & fat, cooked (3 oz) (all cuts)	85	325	20	24	0	10	2.6	0	0.62	0.20	4.2	0
lean only, cooked (2+ oz) (all cuts)	60	150	18	8	0	5	2.2	0	0.57	0.19	3.2	0
ham, light cure, lean & fat, roasted (3 oz)	85	245	18	19	0	10	2.2	0	0.40	0.16	3.1	0
Luncheon meats: bologna (2 sl), pork sausage cooked (2 oz), frankfurter (1), bacon, broiled or fried crisp (3 sl)		185	9	16	---	5	1.3	---	0.21	0.12	1.7	0
Poultry												
chicken; flesh only, broiled (3 oz)	85	115	20	3	0	10	1.4	80	0.05	0.16	7.4	0
fried (2+ oz)	75	170	24	6	1	10	1.6	85	0.05	0.23	8.3	0
turkey, light & dark, roasted (3 oz)	85	160	27	5	0	---	1.5	---	0.03	0.15	6.5	0

Table 1-11 (continued)

Food and Approximate Measure	Weight gm	Food Energy Cal.	Protein gm	Fat gm	Carbohydrate gm	Calcium mg	Iron, mg	Vitamin A Value IU	Thiamine mg	Riboflavin mg	Niacin mg	Ascorbic Acid mg
Fish and shellfish												
salmon (3 oz) (canned)	85	130	17	5	0	165	0.7	60	0.03	0.16	6.8	0
fish sticks, breaded, cooked (3-4)	75	130	13	7	5	10	0.3	--	0.03	0.05	1.2	0
macherel, halibut, cooked	85	175	19	10	0	10	0.8	515	0.08	0.15	6.8	0
blue fish, haddock, herring, perch, shad, cooked (tuna canned in oil, 20 gm)	85	160	19	8	2	20	1.0	60	0.06	0.11	4.4	0
clams, canned; crab meat, canned; lobster, oyster, raw; scallop; shrimp, canned	85	75	14	1	2	65	2.5	65	0.10	0.08	1.5	0
Mature dry beans and peas, nuts, peanuts, related products												
Beans; white with pork and tomato, canned (1 c)	260	320	16	9	50	140	4.7	340	0.20	0.08	1.5	5
red (128 gm), Lima (96 gm), cowpeas (125 gm), cooked (½ c)		125	8	-	25	35	2.5	5	0.13	0.06	0.7	-
Nuts; almonds (12), cashews (8), peanuts (1 tbsp), peanut butter (1 tbsp), pecans (12), English walnuts (2 tbsp), coconut (¼ c)	15	95	3	8	4	15	0.5	5	0.05	0.04	0.9	-
Vegetables and Vegetable products												
Asparagus, cooked, cut spears (2/3 c)	115	25	3	trace	4	25	0.7	1,055	0.19	0.20	1.6	30
Beans; green(½ c), cooked 60 gm, canned 120 gm		15	1	trace	3	30	0.4	340	0.04	0.06	0.3	8
Lima, immature, cooked (½ c)	80	90	6	1	16	40	2.0	225	0.14	0.08	1.0	14
Broccoli spears, cooked (2/3 c)	100	25	3	trace	4	90	0.8	2,500	0.09	0.20	0.8	90
Brussels sprouts, cooked (2/3 c)	85	30	3	trace	5	30	1.0	450	0.07	0.12	0.7	75
Cabbage (110 gm), cauliflower, cooked (80 gm), and sauerkraut canned (150 gm) (reduce ascorbic acid value by one-third for kraut) (2/3 c)		20	1	trace	4	35	0.5	80	0.05	0.05	0.3	37
Carrots, cooked (2/3 c)	95	30	1	trace	7	30	0.6	10,145	0.05	0.05	0.5	6
Corn, 1 ear, cooked (140 gm), canned (130 gm) (½ c)		75	2	trace	18	5	0.4	315	0.06	0.06	1.1	6
Leafy greens, collards (125 gm), dandelions (120 gm) kale (75 gm), mustard (95 gm), spinach (120 gm), turnip (100 gm cooked, 150 gm canned) (2/3 c cooked and canned) (reduce ascorbic acid one-half for canned)		30	3	trace	5	175	1.8	8,570	0.11	0.18	0.8	45
Peas, green (½ c)	80	60	4	1	10	20	1.4	430	0.22	0.09	1.8	16
Potatoes-baked, boiled (100 gm), 10 pc French fried (55 gm) (for fried, add 1 tbsp cooking oil)		85	3	trace	30	10	0.7	trace	0.08	0.04	1.5	16

Table 1-11 (continued)

Food and Approximate Measure	Weight gm	Food Energy Cal.	Protein gm	Fat gm	Carbohydrate gm	Calcium mg	Iron, mg	Vitamin A Value IU	Thiamine mg	Riboflavin mg	Niacin mg	Ascorbic Acid mg
Pumpkin, canned (½ c)	115	40	1	1	9	30	0.5	7,295	0.03	0.06	0.6	6
Squash, winter, canned (½ c)	100	65	2	1	16	30	0.8	4,305	0.05	0.14	0.7	14
Sweet potato, canned (1/2 c)	110	120	2	-	27	25	0.8	8,500	0.05	0.05	0.07	15
Tomato, 1 raw, 2/3 c canned, 2/3 c juice	150	35	2	trace	7	14	0.8	1,350	0.10	0.06	1.0	29
Tomato catsup (2 tbsp)	35	30	1	trace	8	10	0.2	480	0.04	0.02	0.6	6
Other cooked (beets, mushrooms, onions, turnips) (½ c)	95	25	1	-	5	20	0.5	15	0.02	0.10	0.7	7
Others commonly served raw, cabbage (½ c, 50 gm), celery (3 sm stalks, 40 gm), cucumber (½ med, 50 gm), green pepper (½, 30 gm), radishes (5, 40 gm)		10	trace	trace	2	15	0.3	100	0.03	0.03	0.2	20
carrots, raw (½ carrot)	25	10	trace	trace	2	10	0.2	2,750	0.02	0.02	0.2	2
lettuce leaves (2 lg)	50	10	1	trace	2	34	0.7	950	0.03	0.04	0.2	9
Fruits and fruit products												
Cantaloupe (½ med)	385	60	1	trace	14	25	0.8	6,540	0.08	0.06	1.2	63
Citrus and strawberries; orange (1), grapefruit (½), juice (½ c), strawberries (½ c), lemon (1), tangerine (1)		50	1	-	13	25	0.4	165	0.08	0.03	0.3	55
Yellow, fresh; apricots (3), peach (2 med), canned fruit and juice (½ c), or dried, cooked, unsweetened; apricot, peaches (½ c)		85	-	-	22	10	1.1	1,005	0.01	0.05	1.0	5
Other, dried; dates, pitted (4), figs (2), raisins (½ c)	40	120	1	-	31	35	1.4	20	0.04	0.04	0.5	-
Other, fresh; apple (1), banana (1), figs (3), pear (1)		80	-	-	21	15	0.5	140	0.04	0.03	0.2	6
Fruit pie; to 1 serving fruit add 1 tbsp. flour, 2 tbsp sugar, 1 tbsp fat												
Grain products												
Enriched and whole grain; bread (1 sl. 23 gm), biscuit (½), cooked cereals (½ c), prepared cereals (1 oz), Graham crackers (2 lg), macaroni, noodles, spaghetti (½ c, cooked), pancake (1, 27 gm), roll (½), waffle (½, 38 gm)		65	2	1	16	20	0.6	10	0.09	0.05	0.7	-
Unenriched bread (1 sl, 23 gm), cooked cereal (½ c), macaroni, noodles, spaghetti (½ c), popcorn (½ c), pretzel sticks, small (15), roll (½)		65	2	1	16	10	0.3	5	0.02	0.02	0.3	-
Desserts												
Cake, plain (1 pc), doughnut (1). For iced cake or doughnut add value for sugar. For chocolate cake add chocolate (30 gm)	45	145	2	5	24	30	0.4	65	0.02	0.05	0.2	-

Table 1-11 (continued)

Food and Approximate Measure	Weight gm	Food Energy Cal.	Protein gm	Fat gm	Carbohydrate gm	Calcium mg	Iron, mg	Vitamin A Value IU	Thiamine mg	Riboflavin mg	Niacin mg	Ascorbic Acid mg
Cookies, plain (1)	25	120	1	5	18	10	0.2	20	0.01	0.01	0.1	-
Pie crust, single crust (1/7 shell)	20	95	1	6	8	3	0.3	0	0.04	0.03	0.3	-
Flour, white, enriched (1 tbsp)	7	25	1	trace	5	1	0.2	0	0.03	0.02	0.2	0
Fats and Oils												
Butter, margarine (1 pat, ½ tbsp)	7	50	trace	6	trace	1	0	230	---	---	--	-
Fats and oils, cooking (1 tbsp) French dressing (2 tbsp)	14	125	0	14	0	0	0	0	0	0	0	0
Salad dressing, mayonnaise type (1 tbsp)	15	80	trace	9	1	2	0.1	45	trace	trace	trace	0
Sugars, sweets												
Candy, plain, (½ oz), jam and jelly (1 tbsp), syrup (1 tbsp), gelatin dessert, plain (½ c), beverages, carbonated (1 c)		60	0	0	14	3	0.1	trace	trace	trace	trace	trace
Chocolate fudge (1 oz), chocolate syrup (3 tbsp)		125	1	2	30	15	0.6	10	trace	0.02	0.1	trace
Molasses (1 tbsp), caramel (1/3 oz)		40	trace	trace	8	20	0.3	trace	trace	trace	trace	trace
Sugar (1 tbsp)	12	45	0	0	12	0	trace	0	0	0	0	0
Miscellaneous												
Chocolate, bitter (1 oz)	30	145	3	15	8	20	1.9	20	0.01	0.07	0.4	0
Sherbet (½ c)	96	130	1	1	30	15	trace	55	0.01	0.03	trace	2
Soups: bean, pea (green) (1 c)		150	7	4	22	50	1.6	495	0.09	0.06	1.0	4
noodle, beef, chicken (1 c)		65	4	2	7	10	0.7	50	0.03	0.04	0.9	trace
clam chowder, minestrone, tomato, vegetable (1 c)		90	3	2	14	25	0.9	1,880	0.05	0.04	1.1	3

The use of the short method of dietary analysis reduces the time required to compute the nutritive value of a diet. In the evaluation of a mixed dietary using this method the accuracy approximates that of computations using the conventional food table. The values in this table were computed chiefly from the figures compiled by Watt and Merrill in Agriculture Handbook 8, Composition of Foods - Raw, Processed, Prepared, revised 1963. Courtesy of Leichsenring and Wilson, Journal of the American Dietetic Association, 27:386, 1951, Revised.

From *Handbook of Clinical Dietitians*, 1975. Used with permission of the publisher, Mid-Ohio Health Planning Federation, Columbus, Ohio.

Appendix B

Table 1–12 Characteristic Black American Food Choices

Protein Foods	Milk and Milk Products	Grain Products	Vegetables	Fruits	Other
Meat:	Milk:	Rice	Broccoli	Apple	Salt pork
Beef	Fluid	Cornbread	Cabbage	Banana	Carbonated beverages
Pork and ham	Evaporated in coffee	Hominy grits	Carrots	Grapefruit	Fruit drinks
Sausage	Buttermilk	Biscuits	Corn	Grapes	Gravies
Pigs feet, ears, etc.		Muffins	Green Beans	Nectarine	
Bacon	Cheese:	White bread	Greens:	Orange	
Luncheon meat	Cheddar	Dry cereal	Mustard	Plums	
Organ meats	Cottage	Cooked cereal	Collard	Tangerine	
Poultry:		Macaroni	Kale	Watermelon	
Chicken	Ice cream	Spaghetti	Spinach		
Turkey		Crackers	Turnips, etc.		
Fish:			Lima beans		
Catfish			Okra		
Perch			Peas		
Red snapper			Potato		
Tuna			Pumpkin		
Salmon			Sweet potato		
Sardines			Tomato		
Shrimp			Yam		
Eggs					
Legumes:					
Kidney beans					
Red beans					
Pinto beans					
Black-eyed peas					
Nuts:					
Peanuts					
Peanut butter					

Table 1–13 Characteristic Mexican-American Food Choices

Protein Foods	Milk and Milk Products	Grain Products	Vegetables	Fruits	Other
Meat:	Milk:	Rice	Avocado	Apple	Salsa (Tomato-pepper onion relish)
Beef	Fluid	Tortillas:	Cabbage	Apricots	Chili sauce
Pork	Flavored	Corn	Carrots	Banana	Guacamole
Lamb	Evaporated	Flour	Chilies	Guava	Lard (manteca)
Tripe	Condensed	Oatmeal	Corn	Lemon	Pork cracklings
Sausage (chorizo)		Dry cereals:	Green beans	Mango	Fruit drinks
Bologna	Cheese:	Cornflakes	Lettuce	Melons	Kool-aid
Bacon	American	Sugar coated	Onion	Orange	Carbonated beverages
Poultry:	Monterey jack	Noodles	Peas	Peach	Beer
Chicken	Hoop	Spaghetti	Potato	Pear	Coffee
Eggs		White bread	Prickly Pear Cactus leaf (nopales)	Prickly Pear Cactus fruit (tuna)	
Legumes:	Ice cream	Sweet bread (pan dulce)	Spinach	Zapote (or sapote)	
Pinto beans			Sweet potato		
Pink beans			Tomato		
Garbanzo beans			Zucchini		
Lentils					
Nuts:					
Peanuts					
Peanut butter					

Table 1-14 Characteristic Chinese-American Food Choices

Protein Foods	Milk and Milk Products	Grain Products	Vegetables	Fruits	Other
Meat: Pork Beef Organ meats Poultry: Chicken Duck Fish: White fish Shrimp Lobster Oyster Sardines Eggs Legumes: Soybeans Soybean curd (tofu) Black beans Nuts: Peanuts Almonds Cashews	Flavored milk Milk (cooking) Ice cream	Rice Noodles White bread Barley Millet	Bamboo shoots Beans: green yellow Bean sprouts Bok choy Broccoli Cabbage Carrots Celery Chinese cabbage Corn Cucumbers Eggplant Greens: collard Chinese broccoli mustard kale spinach Leeks Lettuce Mushrooms Peppers Potato Scallions	Apple Banana Figs Grapes Kumquats Loquats Mango Melons Orange Peach Pear Persimmon Pineapple Plums Tangerine Vegetables: Snow peas Sweet potato Taro Tomato Water chestnuts White radishes White turnip Winter melon	Soy sauce Sweet and sour sauce Mustard sauce Ginger Plum sauce Red bean paste Tea Coffee

Table 1–15 Characteristic Filipino-American Food Choices

Protein Foods	Milk and Milk Products	Grain Products	Vegetables	Fruits	Other
Meat:	Milk:	Rice	Bamboo shoots	Apple	Soy sauce
Pork	Flavored	Cooked cereals:	Beets	Banana	Coffee
Beef	Evaporated	Farina	Cabbage	Grapes	Tea
Goat	Cheese:	Oatmeal	Carrots	Guava	
Deer	Gouda	Dry cereals	Cauliflower	Lemon	
Rabbit	Cheddar	Pastas	Celery	Lime	
Variety meats		Rice noodles	Chinese celery	Mango	
Poultry:		Wheat noodles	Eggplant	Melons	
Chicken		Macaroni	Endive	Orange	
Fish:		Spaghetti	Green beans	Papaya	
Sole			Leeks	Pear	
Bonito			Lettuce	Pineapple	
Herring			Mushrooms	Plums	
Tuna			Okra	Pomegranate	
Mackerel			Onion	Rhubarb	
Crab			Peppers	Strawberries	
Mussels			Potato	Tangerine	
Shrimp			Pumpkin		
Squid			Radishes		
Eggs			Snow peas		
Legumes:			Spinach		
Black beans			Squash		
Chick peas			Sweet potato		
Black-eyed peas			Tomato		
Lentils			Water chestnuts		
Mung beans			Watercress		
Lima beans			Yam		
White kidney beans					
Nuts:					
Cashews					
Peanuts					
Pili nuts					

Table 1–16 Characteristic Japanese-American Food Choices

Protein Foods	Milk and Milk Products	Grain Products	Vegetables	Fruits	Other
Meat:	Milk	Rice	Bamboo shoots	Apple	Soy sauce
Beef	Ice cream	Rice crackers	Bok choy	Apricot	Nori paste (used to season rice)
Pork	Cheese	Noodles (whole wheat noodle called soba)	Broccoli	Banana	Bean thread (konyaku)
Poultry:			Burdock root	Cherries	Ginger (shoga; dried form called denishoga)
Chicken			Cabbage	Grapefruit	Tea
Turkey			Carrots	Grapes	Coffee
Fish:		Spaghetti	Cauliflower	Lemon	
Tuna		White bread	Celery	Lime	
Mackerel		Oatmeal	Cucumbers	Melons	
Sardines (dried form called mezashi)		Dry cereals (nisei only)	Eggplant	Orange	
Sea bass			Green beans	Peach	
Shrimp			Gourd (kampyo)	Pear	
Abalone			Mushrooms	Persimmon	
Squid			Mustard greens	Pineapple	
Octopus			Napa cabbage	Pomegranate	
Eggs			Peas	Plums (dried pickled plums called umeboshi)	
Legumes:			Peppers		
Soybean curd (tofu)			Radishes (white radish called daikon; pickled white radish called takawan)	Strawberries	
Soybean paste (miso)				Tangerine	
Soybeans			Snow peas		
Red beans (azuki)			Spinach		
Lima beans			Squash		
Nuts:			Sweet potato	Vegetables:	
Chestnuts (kuri)			Taro (Japanese sweet potato)	Turnips	
			Tomato	Water chestnuts	
				Yam	

Tables 1–12 through 1–16 from Corruccini, C.G. and Cruskie, P.E.: *Nutrition During Pregnancy and Lactation*. California Department of Health, 1975.

Appendix C–1

What Is a Good Diet?

There is no one diet that is ideal for everyone. However, following a few basic principles when you select foods will ensure you a healthful diet.

1. *Eat varied and balanced meals.* For healthy functioning, your body needs many different nutrients — proteins, carbohydrates, fats, water, vitamins, and minerals. Not all foods contain all nutrients, so to receive adequate amounts of each, you should select a variety of foods from the four food groups: dairy products, meats and fish, cereals and grains, and fruits and vegetables.
2. *Do not overeat.* Depending upon your size, rate of metabolism, and level of activity, your body requires a certain amount of calories per day to maintain your weight. Any extra calories you eat will be converted to fat and stored.
3. *Eat less fat, salt, and sugar.* Most Americans eat too much fat, salt, and sugar. Try to decrease the total amount of fat you eat, for example, by selecting fewer fatty meats and more fish and poultry. Also try to consume more polyunsaturated fats (vegetable oils) than saturated fats (meats, butter).

   Attempt to cut down on salt by taking the saltshaker off of the table or by adding half the amount called for in recipes. If you usually cook with salt pork or fatback, cut the amount in half. Many commercially prepared foods contain a lot of salt.

   Nutritionists speak of sugar as "empty" calories — calories with no protein, fat, vitamins, or minerals. Additionally, sugar in sticky products may promote tooth decay. To reduce the amount of sugar you eat, cut down your consumption of cookies, cakes, candies, and sodas.
4. *Eat more fruits, vegetables, and whole grains.* Fruits and vegetables are good sources of vitamins and minerals. Whole grains not only supply carbohydrates, but also protein, vitamins, and minerals.

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Appendix C–2

Who Needs Vitamin and Mineral Supplements?

To function well, your body needs small amounts of vitamins and minerals. As a guide to how much of each vitamin and mineral you need each day, the Food and Nutrition Board of the National Academy of Sciences has established Recommended Dietary Allowances (RDA) that are sufficient for all but a few people with special requirements. By eating a balanced diet, consisting of a variety of foods from the four food groups (dairy products; meats, eggs and fish; cereals and grains; fruits and vegetables), you can easily get the recommended amount of each vitamin and mineral.

Some people need to supplement their diets with vitamins and minerals in pill form, either because they require more than the RDA or because their diet is unbalanced. For example, women who are pregnant or are taking oral contraceptives require extra folic acid and pyridoxine, and possibly iron. Other people whose doctors may recommend vitamin and mineral supplements are those with chronic diseases, heavy drinkers, and those taking certain drugs that interfere with the body's ability to absorb nutrients. Also, anyone who eats poorly should take extra vitamins and minerals. If your doctor prescribed vitamin and mineral pills for you, remember that they are not a substitute for good nutrition; try to eat a balanced diet.

Megavitamins

You may have heard or read about taking "megavitamins" — doses of vitamins much larger than the RDA to cure or prevent disease. Most physicians and nutritionists are confident that the RDA are more than adequate for a healthy person. Taking large doses of vitamins and minerals is unnecessary, expensive, and can be harmful.

A vitamin is either water-soluble or fat-soluble. Water-soluble vitamins such as vitamin C are not stored in the body; any excess you take in will be excreted in the urine but may interfere with utilization of medication. On the other hand, fat-soluble vitamins such as A and D are stored in the body. A large enough excess may poison the body. For instance, too much vitamin A can cause headaches, constipation, and diarrhea.

If you wish to take supplemental vitamins, do not exceed the amounts listed below:

Vitamin	International Units per Day
A	5,000
D	400
E	100

Minerals can also be harmful when consumed in quantities much greater than the RDA.

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Appendix D

Table 1-17 Mean Heights and Weights and Recommended Energy Intake

Category	Age (years)	Weight (kg)	Weight (lb)	Height (cm)	Height (in)	Energy Needs (with range) (kcal)	(MJ)
Infants	0.0-0.5	6	13	60	24	kg X 115 (95-145)	kg X .48
	0.5-1.0	9	20	71	28	kg X 105 (80-135)	kg X .44
Children	1 - 3	13	29	90	35	1300 (900 - 1800)	5.5
	4 - 6	20	44	112	44	1700 (1300 - 2300)	7.1
	7 - 10	28	62	132	52	2400 (1650 - 3300)	10.1
Males	11 - 14	45	99	157	62	2700 (2000 - 3700)	11.3
	15 - 18	66	145	176	69	2800 (2100 - 3900)	11.8
	19 - 22	70	154	177	70	2900 (2500 - 3300)	12.2
	23 - 50	70	154	178	70	2700 (2300 - 3100)	11.3
	51 - 75	70	154	178	70	2400 (2000 - 2800)	10.1
	76 +	70	154	178	70	2050 (1650 - 2450)	8.6
Females	11 - 14	46	101	157	62	2200 (1500 - 3000)	9.2
	15 - 18	55	120	163	64	2100 (1200 - 3000)	8.8
	19 - 22	55	120	163	64	2100 (1700 - 2500)	8.8
	23 - 50	55	120	163	64	2000 (1600 - 2400)	8.4
	51 - 75	55	120	163	64	1800 (1400 - 2200)	7.6
	76 +	55	120	163	64	1600 (1200 - 2000)	6.7
Pregnancy						+ 300	
Lactation						+ 500	

The data in this table have been assembled from the observed median heights and weights of children, together with desirable weights for adults for the mean heights of men (70 inches) and women (64 inches) between the ages of 18 and 34 years as surveyed in the US population (HEW/NCHS data).

The energy allowances for the young adults are for men and women doing light work. The allowances for the two older age groups represent mean energy needs over these age spans, allowing for a 2% decrease in basal (resting) metabolic rate per decade and a reduction in activity of 200 kilocalories per day for men and women between 51 and 75 years, 300 kilocalories for men over 75 years, and 400 kilocalories for women over 75. The customary range of daily energy output is shown for adults in parentheses and is based on a variation in energy needs of ± 400 kilocalories at any one age, emphasizing the wide range of energy intakes appropriate for any group of people.

Energy allowances for children through age 18 are based on median energy intakes of children these ages followed in longitudinal growth studies. The values in parentheses are 10th and 90th percentiles of energy intake, to indicate the range of energy consumption among children of these ages.

Table 1–18 Food and Nutrition Board, National Academy of Sciences – National Research Council Recommended Daily Dietary Allowances,[a] Revised 1980

Designed for the maintenance of good nutrition of practically all healthy people in the U.S.A.

	Age (years)	Weight (kg)	Weight (lb)	Height (cm)	Height (in)	Protein (g)	Fat-Soluble Vitamins: Vitamin A (μg RE)[b]	Fat-Soluble Vitamins: Vitamin D (μg)[c]	Fat-Soluble Vitamins: Vitamin E (mg α-TE)[d]	Water-Soluble Vitamins: Vitamin C (mg)	Water-Soluble Vitamins: Thiamin (mg)	Water-Soluble Vitamins: Riboflavin (mg)	Water-Soluble Vitamins: Niacin (mg NE)[e]	Water-Soluble Vitamins: Vitamin B-6 (mg)	Water-Soluble Vitamins: Folacin[f] (μg)	Water-Soluble Vitamins: Vitamin B-12 (μg)	Minerals: Calcium (mg)	Minerals: Phosphorus (mg)	Minerals: Magnesium (mg)	Minerals: Iron (mg)	Minerals: Zinc (mg)	Minerals: Iodine (μg)
Infants	0.0–0.5	6	13	60	24	kg × 2.2	420	10	3	35	0.3	0.4	6	0.3	30	0.3[g]	360	240	50	10	3	40
	0.5–1.0	9	20	71	28	kg × 2.0	400	10	4	35	0.5	0.6	8	0.6	45	1.5	540	360	70	15	5	50
Children	1–3	13	29	90	35	23	400	10	5	45	0.7	0.8	9	0.9	100	2.0	800	800	150	15	10	70
	4–6	20	44	112	44	30	500	10	6	45	0.9	1.0	11	1.3	200	2.5	800	800	200	10	10	90
	7–10	28	62	132	52	34	700	10	7	45	1.2	1.4	16	1.6	300	3.0	800	800	250	10	10	120
Males	11–14	45	99	157	62	45	1000	10	8	50	1.4	1.6	18	1.8	400	3.0	1200	1200	350	18	15	150
	15–18	66	145	176	69	56	1000	10	10	60	1.4	1.7	18	2.0	400	3.0	1200	1200	400	18	15	150
	19–22	70	154	177	70	56	1000	7.5	10	60	1.5	1.7	19	2.2	400	3.0	800	800	350	10	15	150
	23–50	70	154	178	70	56	1000	5	10	60	1.4	1.6	18	2.2	400	3.0	800	800	350	10	15	150
	51+	70	154	178	70	56	1000	5	10	60	1.2	1.4	16	2.2	400	3.0	800	800	350	10	15	150
Females	11–14	46	101	157	62	46	800	10	8	50	1.1	1.3	15	1.8	400	3.0	1200	1200	300	18	15	150
	15–18	55	120	165	64	46	800	10	8	60	1.1	1.5	14	2.0	400	3.0	1200	1200	300	18	15	150
	19–22	55	120	165	64	44	800	7.5	8	60	1.1	1.3	14	2.0	400	3.0	800	800	300	18	15	150
	23–50	55	120	165	64	44	800	5	8	60	1.0	1.2	13	2.0	400	3.0	800	800	300	18	15	150
	51+	55	120	165	64	44	800	5	8	60	1.0	1.2	13	2.0	400	3.0	800	800	300	10	15	150
Pregnant						+30	+200	+5	+2	+20	+0.4	+0.3	+2	+0.6	+400	+1.0	+400	+400	+150	h	+5	+25
Lactating						+20	+400	+5	+3	+40	+0.5	+0.5	+5	+0.5	+100	+1.0	+400	+400	+150	h	+10	+50

[a] The allowances are intended to provide for individual variations among most normal persons as they live in the United States under usual environmental stresses. Diets should be based on a variety of common foods in order to provide other nutrients for which human requirements have been less well defined.

[b] Retinol equivalents. 1 retinol equivalent = 1 μg retinol or 6 μg β carotene.

[c] As cholecalciferol. 10 μg cholecalciferol = 400 IU of vitamin D.

[d] α-tocopherol equivalents. 1 mg *d*-α tocopherol = 1 α-TE.

[e] 1 NE (niacin equivalent) is equal to 1 mg of niacin or 60 mg of dietary tryptophan.

[f] The folacin allowances refer to dietary sources as determined by *Lactobacillus casei* assay after treatment with enzymes (conjugases) to make polyglutamyl forms of the vitamin available to the test organism.

[g] The recommended dietary allowance for vitamin B-12 in infants is based on average concentration of the vitamin in human milk. The allowances after weaning are based on energy intake (as recommended by the American Academy of Pediatrics) and consideration of other factors, such as intestinal absorption.

[h] The increased requirement during pregnancy cannot be met by the iron content of habitual American diets nor by the existing iron stores of many women; therefore the use of 30–60 mg of supplemental iron is recommended. Iron needs during lactation are not substantially different from those of nonpregnant women, but continued supplementation of the mother for 2–3 months after parturition is advisable in order to replenish stores depleted by pregnancy.

Table 1–19 Estimated Safe and Adequate Daily Dietary Intakes of Additional Selected Vitamins and Minerals[a]

Vitamins

	Age (years)	Vitamin K (μg)	Biotin (μg)	Pantothenic Acid (mg)
Infants	0–0.5	12	35	2
	0.5–1	10–20	50	3
Children	1–3	15–30	65	3
and	4–6	20–40	85	3–4
Adolescents	7–10	30–60	120	4–5
	11+	50–100	100–200	4–7
Adults		70–140	100–200	4–7

Trace Elements[b]

	Age (years)	Copper (mg)	Manganese (mg)	Fluoride (mg)	Chromium (mg)	Selenium (mg)	Molybdenum (mg)
Infants	0–0.5	0.5–0.7	0.5–0.7	0.1–0.5	0.01–0.04	0.01–0.04	0.03–0.06
	0.5–1	0.7–1.0	0.7–1.0	0.2–1.0	0.02–0.06	0.02–0.06	0.04–0.08
Children	1–3	1.0–1.5	1.0–1.5	0.5–1.5	0.02–0.08	0.02–0.08	0.05–0.1
and	4–6	1.5–2.0	1.5–2.0	1.0–2.5	0.03–0.12	0.03–0.12	0.06–0.15
Adolescents	7–10	2.0–2.5	2.0–3.0	1.5–2.5	0.05–0.2	0.05–0.2	0.10–0.3
	11+	2.0–3.0	2.5–5.0	1.5–2.5	0.05–0.2	0.05–0.2	0.15–0.5
Adults		2.0–3.0	2.5–5.0	1.5–4.0	0.05–0.2	0.05–0.2	0.15–0.5

Electrolytes

	Age (years)	Sodium (mg)	Potassium (mg)	Chloride (mg)
Infants	0–0.5	115–350	350–925	275–700
	0.5–1	250–750	425–1275	400–1200
Children	1–3	325–975	550–1650	500–1500
and	4–6	450–1350	775–2325	700–2100
Adolescents	7–10	600–1800	1000–3000	925–2775
	11+	900–2700	1525–4575	1400–4200
Adults		1100–3300	1875–5625	1700–5100

[a]Because there is less information on which to base allowances, these figures are not given in the main table of the RDA and are provided here in the form of ranges of recommended intakes.
[b]Since the toxic levels for many trace elements may be only several times usual intakes, the upper levels for the trace elements given in this table should not be habitually exceeded.

Tables 1–17 through 1–19 from: *Recommended Dietary Allowances*, Ninth Edition (1980), with the permission of the National Academy of Sciences, Washington, D.C.

Appendix E

Table 1–20 Principal Food Sources of Selected Nutrients

Nutrient	Principal Food Sources
Fat-Soluble Vitamins	
Vitamin A	Butter and fortified margarines, yellow vegetables, liver, egg yolk
Vitamin D	Butter, egg yolk, ultraviolet radiation, fortified milk
Vitamin E	Vegetable oils, cereals, eggs, green leafy vegetables
Vitamin K	Turnip greens, broccoli, lettuce
Water-Soluble Vitamins	
Vitamin C	Citrus fruits, tomatoes, potatoes, cabbage, green peppers
Folacin	Green vegetables, nuts, liver
Thiamin (vitamin B_1)	Wheat germ, enriched bread and cereals, grains, pork, nuts, legumes
Riboflavin (vitamin B_2)	Milk, liver, cooked spinach and other green leafy vegetables, enriched breads and cereals
Pyridoxine (vitamin B_6)	Organ meats, fish, cereals, legumes
Vitamin B_{12}	Only foods from animal sources
Minerals	
Calcium	Milk and milk products, cheeses
Phosphorus	Liver, wheat germ, wheat
Iodine	Iodized salt, ocean fish, seafood
Iron	Liver, meat, egg yolks, wheat germ, enriched bread and cereals, dried fruits, broccoli
Magnesium	Nuts, soybeans, green leafy vegetables
Zinc	Nuts, green leafy vegetables, meats
Potassium	Cantaloupe, bananas, oranges, apricots, watermelon, dried fruits

Some Abbrevations Used in the Nutrition in Primary Care Series

ATP	adenosine triphosphate
c	cup
cc	cubic centimeter
CNS	central nervous system
FDA	Food and Drug Administration
gm	gram
IBW	ideal body weight
IU	International Units
kcal	kilocalorie
kg	kilogram
lb	pound
lg	large
MCV	mean corpuscular volume
MDR	minimum daily requirement
med	medium
mEq	milliequivalent
mg	milligram
MJ	megajoule
ml	milliliter
oz	ounce
RDA	Recommended Dietary Allowances
RE	retinol equivalents
sl	slice
sm	small
Tbsp	Tablespoon
TPN	total parenteral nutrition
tsp	teaspoon
USDA	United States Department of Agriculture